

No. 7.— *The Ethopolidae of America North of Mexico.*

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THE Ethopolidae (Chamberlin, Bull. M. C. Z., 1915, 59, p. 531) embraces a group of genera in the Lithobioidea characterized chiefly by having the coxal pores in several series.

Bothropolys (*βόθρος*, pit, and *πολύς*, many) was proposed by Wood in 1863 for several American species having the characteristic mentioned. Later Stuxberg (Öfvers. Kongl. vet. akad. Förh., 1875, 32, no. 3, p. 5-22) merged the group again with *Lithobius* which he subdivided into subgenera according to the angulation of the dorsal plates, a system which, though manifestly in large part artificial, has been followed by nearly all subsequent students.

Latzel in his work on *Die Myriopoden der Österreichisch-Ungarischen Monarchie* (1880, 1, p. 35) regarded Wood's grouping as natural. In speaking of it he writes:—

er, was nur löblich ist, alle Arten der Gatt. *Lithob.* mit zahlreichen, ungeordneten oder in unregelmässige Reihen vertheilten Hüftporen unter dem gemeinsamen Gruppennamen *Bothropolys* zusammenfasste. Leider ist daran doch zweierlei zu tadeln: einmal ist der Name *Bothropolys* entschieden falsch gebildet, da er richtig *Polybothrus* heissen sollte; dann hat Wood unterlassen, auch consequenterweise den Rest der Gattung zu benennen, der etwa mit dem Namen *Oligobothrus* zu belegen gewesen wäre. Ich bin geneigt zu glauben, dass diese Zweitheilung der *Lithobius*-Arten im Sinne Wood's sehr natürlich ist, da man bezüglich der Hüftporen nie, bezüglich der Zahnbildungen an den Rückenschilden, besonders beim Subgenus *Neolithobius* und *Hemilithobius* leicht im Verlegenheit geräth. Die Gruppe *Polybothrus* umfasst bisher nur (18 bis 45 mm) grosse Formen, die sich auch durch zahlreiche (nämlich 12-20) Hüftzähne auszeichnen. In die Gruppe *Oligobothrus* gehören Arten, deren Körperlänge von 31 mm bis unter 8 mm heruntersinkt, und deren Hüftzähne meist in der Zahl 10-16 auftreten, oder andererseits fast völlig verkümmert sind. Ferner haben die Arten der Gruppe *Polybothrus* in der männlichen Form gut entwickelte Genitalanhänge, während die Männchen der Gruppe *Oligobothrus* stets, bis auf 2 kleine behaarte Würzchen, verkümmerte Genitalanhänge haben.

But while thus recognizing the naturalness of Wood's system and urging objections to that of Stuxberg, Latzel adopts the latter throughout "wegen ihrer sonstigen Bequemlichkeit," a procedure which it seems difficult to justify. Of course the suggestion of a change from *Bothropolys* to *Polybothrus* on etymological grounds cannot be fol-

lowed; while the name *Oligobothrus* was wholly unnecessary as its function was already filled by *Lithobius sens. str.*, whether the groups were to be recognized as genera or as subgenera.

In 1896 Brolemann (Ann. Ent. soc. France, **65**, p. 45) recognized *Bothropolys* as a subgenus but unnecessarily used Latzel's *Oligobothrus* for *Lithobius sens. str.*

In 1901 Pocock (Ann. mag. nat. hist., ser. 7, **8**, p. 448) considered *Bothropolys* as proposed by Wood a valid genus, and Verhoeff (Bronn's Thierreich, 1907, **5**, p. 234 *et seq.*) also accepts it and at the same time separates from it the European species as a distinct genus p. 237:—

- k. Antennen fast konstant aus 20 Gliedern bestehend (selten 17 bis 23).  
 Nordamerikanische und orientalische Formen. . . . *Bothropolys*.  
 l. Antennen aus 30–80 Gliedern bestehend. Paläarktische Formen.  
*Polybothrus*.

*Polybothrus* is attributed to Latzel; but manifestly this name cannot be thus used, inasmuch as it was proposed, as seen above in the passage quoted from that author, strictly as an etymological reformation of and substitute for *Bothropolys* and must be wholly eliminated from use as a synonym of the latter. Verhoeff divides *Polybothrus* into subgenera by applying the Stuxberg system; but unfortunately he lists no species for any of these groups and the names given are therefore difficult to apply and also really without standing. We may, however, use the name *Eupolybothrus* for the European genus of which *Lithobius grossipes* C. Koch may be specified as the type. It is quite possible that there will be found to exist among the Eurasian species other genera. In North America the species of the Ethopodidae fall into three genera. It will be noted that the American genera differ from the European not only in the smaller number of antennal joints, a character not applicable in younger specimens, but especially in the presence of a stout ventral spine on the posterior coxae. The latter character is developed in very young specimens. This spine is present while the coxal pores are still uniseriate; and as a ventral coxal spine is present in no other American genera excepting the rare *Zinapolys*, its presence may serve in separating the young of these genera from the other lithobioids (*cf.* Can. ent., 1911, **43**, p. 379).

Among European Lithobiidae, the species *Lithobius dalmaticus* Latzel also has the coxae of the anal legs, though not of the penult, similarly armed with a stout ventral spine. This species is evidently generically distinct from the American *Zinapolys* and may stand as the type of a new genus, *Abrotobius*.

*Key to Genera of Ethopolidae.*

- a. Posterior coxae unarmed ventrally; articles of antennae 30 or more.  
*Eupolybothrus*, gen. nov.
- aa. Coxae of last one or two pairs of coxae armed ventrally with a stout spine; articles of antennae normally 20 (rarely varying to as many as 27).
- b. Lateral margining of head continuous, not interrupted or broken (Plate 1, fig. 1); basal spines of ♀ gonopods 2+2.
- c. Prosternum with a distinct diastema in dental line on each side in which the spine is inserted; only anal coxae ventrally armed.  
*Zygethopolys*, gen. nov.
- cc. Prosternum without diastema in dental line, the spine inserted at each anteroeotal angle; last 2 pairs of coxae ventrally armed.  
*Bothropolys* Wood.
- bb. Lateral margining of head discontinuous or interrupted laterally (Plate 4, fig. 1); basal spines of ♀ gonopods 3 + 3 or 4 + 4.  
*Ethopolys* Chamberlin.

Among other characters presented by *Eupolybothrus* it may be mentioned that the gonopods of the male are biarticulate as in *Ethopolys*; that no diastema is present on the prosternum; and that in most the claw of the gonopods of the female is entire and the basal spines 2 + 2; margin of head discontinuous as in *Ethopolys*. Examination of European species not accessible may reveal other genera. The genus has not been found in America.

The North American species of the *Ethopolidae* with the single exception of *B. multidentatus* (Newport) are found in the region west of the Rocky Mountains. In this western region they occur abundantly from Mexico to Alaska and in most parts of this territory are the largest of the *Lithobioidea*. East of the Rocky Mountains, and particularly in the southeastern states, the *Ethopolidae* are replaced by the large species of *Lithobius* proper which are comparatively rare, or in many parts wholly absent from, the western states.

## BOTHROPOLYS Wood (emend. auct.).

Journ. Acad. nat. sci. Phil., 1863, new ser., 5, p. 15. Trans. Amer. philos. soc., 1865, 13, p. 152. Verhoeff, Bronn's Thierreich, 1907, 5, p. 24. Chamberlin, Can. ent., 1912, 44, p. 173.

*Polybothrus* Latzel, Myr. Österreich.-Ungar. monarch., 1880, 1, p. 35.

Marginal thickening of head continuous forward to eyes, not interrupted or broken at sides (Plate 1, fig. 1).

Antennae short, mostly not reaching caudad of the seventh segment;

composed of twenty articles, or occasionally of as many as twenty-four.

Prosternal spine well chitinized, situated at or near each anterior angle ectad of all the teeth, the latter being more or less uniformly spaced with no diastema separating them into two groups on each side (Plate 2, fig. 2, 3).

Claw of anal legs single; that of the penult legs either single or with a single accessory claw minute or obsolete. Ventral spines of anal legs normally 1, 1, 3, 2, 1.

Coxae of last two pairs of legs each bearing a stout ventral spine as well as being armed laterally and dorsally.

Gonopods of male uniarticulate.

Gonopods of female with the claw tripartite, the lateral divisions being situated but little proximad of the median, the three often on a level or nearly so; basal spines 2 + 2, or, occasionally, 2 + 3.

TYPE.—*Bothropolys multidentatus* (Newport).

In the species of this genus there is particularly well marked on each side of the head a semicircular submarginal impression (line of muscle attachment), the anterior end of which is near the eye, the caudal end curving mesad and appearing as a short transverse sulcus at about one third the length from the caudal margin.

There is but little variation in the spining of the legs from species to species within the genus. The dorsal spines of the anal legs are uniformly 1, 0, 3, 1, 0; the ventral 1, 1, 3, 2, 1, rarely increased to 1, 1, 3, 3, 2 or falling to 1, 1, 3, 2, 0 on one side; claw single or with a slight point representing an accessory claw. Dorsal spines of the penult legs 1, 0, 3, 1, 1; ventral, 1, 1, 3, 3, 1, rarely 1, 1, 3, 3, 2; claw one, or with a single accessory claw. Dorsal spines of thirteenth legs 1, 0, 3, 1, 1 to 1, 0, 3, 2, 2; ventral uniformly 0, 1, 3, 3, 2. Dorsal spines of twelfth legs 1, 0, 3, 1, 1 to 1, 0, 3, 2, 2; ventral always 0, 1, 3, 3, 2. Dorsal spines of eleventh legs 0, 0, 3, 2, 2 or 1, 0, 3, 2, 2; ventral 0, 0, 3, 3, 2 or 0, 0, 2, 3, 2. Dorsal spines of first and second legs 0, 0, 3, 2, 1 or 0, 0, 3, 2, 2; ventral always 0, 0, 2, 3, 2.

The prosternal spine in the immature stages is attenuated and distally slender and bristle-like (Plate 2, fig. 3); but in the great majority of specimens, the slender apical portion is lost in the adult, leaving the spine blunt at tip and proportionately short (Plate 1, fig. 6, 7 and Plate 2, fig. 2).

In variations in the claw of the female gonopods resulting in partial or complete obliteration of teeth or lobes, the result is due to an apparent filling in of the short incisions normally present between the teeth.

This gives a distally broad, subtruncate claw (Plate 2, fig. 7; Plate 3, fig. 1); *cf.* further under *Ethopolys*.

In the known species of the genus as here restricted, the posterior angles of the ninth, eleventh, and thirteenth dorsal plates, or of those together with those of the sixth and seventh, are produced. However, in *Bothropolys* as conceived by Verhoeff, there is greater variation in this respect, species with the angles of more of the dorsal plates or with those of the fourth, sixth, seventh, ninth, eleventh, thirteenth, and fourteenth, produced being also included. Verhoeff (Bronn's Thierreich, 1907, 5, p. 240) proposes a purely artificial division of the genus, which he attributes to the North American and Oriental regions, as follows:—

- α). Tergite ohne Fortsätze am Hinterrande. Coxosternum der Kieferfüsse mit 6 + 6 Zähnen. 7–9 Ocellen jederseits.  
*Probothropolys* n. subg.
- β). 9., 11., 13. Tergit hinten mit Fortsätzen. Coxosternum der Kieferfüsse mit 7 + 7 bis 10 + 10 Zähnen. 10–21 Ocellen jederseits.  
*Allobothropolys* n. subg.
- γ). 6., 7., 9., 11., 13. Tergit hinten mit Fortsätzen. Coxosternum der Kieferfüsse mit 6 + 6 bis 9 + 9 Zähnen. 19–35 Ozellen jederseits.  
*Eubothropolys* n. subg.
- δ). 4., 6., 7., 9., 11., 13. und 14. Tergit hinten mit Fortsätzen. Coxosternum der Kieferfüsse mit 7–8 Zähnen. Ocellen ca. 30 jederseits.  
*Telobothropolys* n. subg.

Of the characters used in this key, those drawn from the prosternal teeth and eyes are, as given, wholly worthless since not even the species can be separated by them. This leaves only the one character of the angulation of the dorsal plates, the exclusive use of which gives an artificial grouping, species of really different genera, *e.g.*, of *Bothropolys sens. str.* and *Ethopolys* being brought together and at the same time separated from others truly congeneric with them. It will be seen that Verhoeff ignores the rule that the subgenus containing the type of the genus must bear the name of the latter. However, under any conditions, his subgeneric names have no standing, since he lists no species under any of them. Because of their composite character it would be difficult to apply them with any certainty; and it therefore seems the only course open is to regard them as *nomina nuda* in accord with a strict application of the rules of nomenclature. Of the two groups into which the North American species of *Bothropolys* as here restricted fall, *Bothropolys sens. str.* must be applied to that containing *B. multidentatus* (Newport), while the second may stand as *Poropolys*, subgen. nov., with *B. permundus* Chamberlin as its type.

*Key to Species of Bothropolys.*

- a. Posterior angles of the sixth and seventh dorsal plates not produced.  
*Poropolys*, subgen. nov.
- b. Ninth dorsal plate with the posterior angles only very slightly produced, those of eleventh and thirteenth with processes small.  
 Body near 9.5 times longer than width of tenth plate.  
*B. victorianus*, sp. nov.
- bb. Posterior angles of ninth, eleventh, and thirteenth dorsal plates strongly produced. Body mostly from 7 to 8, or but little more, times as long as width of the tenth plate.
- c. First dorsal plate of the male as wide as the eighth and as wide as or mostly a little wider than the tenth; ocelli 27 to 37 in mostly 5 series; length of *maturus* from 23 to 40 mm. . . . . *B. hople*s Brolemann.
- cc. First dorsal plate of the male distinctly narrower than the eighth and tenth plates; ocelli 15 to 25, mostly in 3 or 4 series; length of *maturus* 19 to 27 mm. . . . . *B. permundus* Chamberlin.
- aa. Posterior angles of the sixth, seventh, ninth, and eleventh dorsal plates produced. . . . . *Bothropolys sens. str.*
- b. Head wider than long; prosternum about 1.8 times wider than long; body not more than eight times longer than the width of the tenth plate. . . . . *B. multidentatus* (Newport).
- bb. Head as long as wide or slightly longer; prosternum between 1.5 and 1.6 times wider than long; body nearly nine times longer than the width of the tenth plate. . . . . *B. columbiensis*, sp. nov.

BOTHROPOLYS *sens. str.*

BOTHROPOLYS MULTIDENTATUS (Newport).

Plate 1, fig. 1-S.

- Lithobius multidentatus* Newport, Trans. Linn. soc. London, 1845, **19**, p. 365.  
 Gervais, Hist. nat. ins. Aptères, 1847, **4**, p. 236. Newport, Cat. Myr., 1856, p. 17. Chamberlin, Ann. Ent. soc. Amer., 1909, **2**, p. 190.
- Bothropolys nobilis* Wood, Journ. Acad. nat. sci. Phil., 1863, new ser. **5**, p. 15.
- Bothropolys multidentatus* Wood, Trans. Amer. philos. soc., 1865, new ser., 1865, **13**, p. 152. Chamberlin, Can. ent., 1911, **43**, p. 98. Ann. Ent. soc. Amer., 1911, **4**, p. 48. Can. ent., 1914, **46**, p. 301. Psyche, 1918, **25**, p. 24.
- Lithobius (Eulithobius) multidentatus* Stuxberg, Öfvers. Kongl. vet. akad. Förh., 1875, **32**, no. 3, p. 10, 26. Bollman, Proc. U. S. N. M., 1887, **10**, p. 263.

DESCRIPTION.—Dorsum varying from light yellowish brown, with the first and last several segments often darker, through chestnut to

FIG. 1.—Distribution of *Bothropolys* Wood.

deep mahogany in specimens in full color. The head varies from reddish brown or chestnut to almost black. Venter but little paler than dorsum. Legs like venter, but tarsi distinctly paler, in the last pair, especially, usually distally rufous with the tibia also often affected.

Antennae mostly concolorous with head, distinctly rufous distally. Prothorax a little paler than head, the prehensorial feet paler, in darker specimens rufous especially caudad and distally.

Body attenuated caudad, but only slightly so cephalad, the sides being nearly parallel from the head to the tenth plate. Body from seven to eight times longer than the width of the tenth plate.

Head much wider than long, the ratio usually near 7:6.5; widest just caudad of eyes, the sides from these first running nearly parallel, converging but slightly, and these over the caudal third of length converging a little more strongly to the rounded caudal corners; caudal margin mesally nearly straight, curving forwards on each side. Moderately roughened.

Ocelli arranged in an elongate area in which mostly five to seven, often irregular, series can be detected, from twenty-five to forty in number; *e.g.*, 1 + 4, 6, 7, 6, 5, 4; 1 + 4, 5, 6, 6, 5, 4. Single ocellus large, subcircular.

Antennae short, usually reaching to about the middle of the seventh segment. Articles typically twenty, varying also, on the one hand, to nineteen, and, on the other, to twenty-three or twenty-four; all articles long and differing slightly in proportions, or, sometimes, a number of those immediately preceding the ultimate shortened, the ultimate usually long and slender but also sometimes shortened. Articles densely clothed with moderately long hairs, less densely so proximad.

The prothorax mostly near 1.8 times wider than long, being thus unusually wide. Mesal incision rather deep, its sides subparallel, rounded at bottom. Teeth uniform in size and spacing, mostly from 7 + 7 to 9 + 9 in number. Spine stout, in younger specimens always drawn out to a slender acute apical portion, but in older ones this slender apical portion is commonly lost, leaving the spine blunt distally and proportionately short (Plate 1, fig. 7). The form of the spine in younger specimens or occasionally even in large adults is shown (Plate 1, figs. 8).

Dorsal plates not much roughened, the caudal ones more so than the anterior. The usual submarginal transverse sulcus on the third, fifth, seventh, eighth, tenth, twelfth, and fourteenth plates extending from margin mesad or somewhat obliquely mesocephalad a little back of middle of length. Posterior angles of sixth, seventh, ninth, eleventh, and thirteenth dorsal plates produced, the processes of the sixth sometimes evenly rounded distad rather than acute, and the inner side of those of the seventh sometimes long, the angulation of these two plates varying considerably.



Typically the first ventral plate is broadly mesally depressed; the other plates show three impressions, a median and a lateral on each side, the latter usually farther cephalad and often replaced by a pair of impressions of which one lies caudad of the other; there these impressions in some specimens pit-like, with the median one tending to elongate transversely on the anterior plates and longitudinally on the posterior ones; often all three impressions take on the character of longitudinal furrows, of which the median one is especially conspicuous on the more caudal segments. In the male the lateral furrows on the fourteenth plate converge caudad and are united by a transverse impression immediately in front of the smooth caudal portion, but the median furrow often causes this impression and extends to or nearly to the caudal margin; the lateral furrows on the fifteenth plate also united transversely but less converging than those of the fourteenth; the smooth pilose border, especially laterally, less sharply defined than in *Ethopolys* and the last two plates less abruptly differentiated from those preceding it. In the female the lateral furrows of the fourteenth and fifteenth plates are either not evident or weakly impressed, and more widely separated and less converging than in the male; but a transverse impression is sometimes conspicuously developed. Posterior plates in male shortly subdensely pilose especially on borders of last two; less as in the female.

Coxal pores numerous, arranged in three to five series, which are commonly irregular. Pores mostly small, increasing in size as usual from most anterior series to those of most posterior in which they are of moderate size and often elliptical in shape.

Spines of first and second legs,  $\frac{0, 0, 3, 2, 1}{0, 0, 2, 3, 2}$ ; of the third to ninth,  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$ ; of the tenth and eleventh,  $\frac{0, 0, 3, 2, 2}{0, 0, 3, 3, 2}$  or  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$ ; of the twelfth,  $\frac{1, 0, 3, 1, 1}{0, 1, 3, 3, 2}$ , the first formula being commonest; of the thirteenth the same as of the twelfth excepting that the ventral spines may be  $0, 1, 3, 3, 1$ ; of the penult,  $\frac{1, 0, 3, 1, 1}{1, 1, 3, 3, 1}$ , rarely  $\frac{1, 0, 3, 1, 1}{1, 1, 3, 3, 2}$ , the claw armed with a very small accessory claw; of the anal legs,  $\frac{1, 0, 3, 1, 0}{1, 1, 3, 2, 1}$ , rarely to  $\frac{1, 0, 3, 1, 0}{1, 1, 3, 3, 2}$ , the claw single or else with an accessory claw represented by a minute or obsolete point. Last two pairs of coxae laterally armed.

Anal legs in female slender, rather short. In the male they are somewhat thicker; tibia a little clavately thickened distad and at the distal end the dorsal surface is raised into a slight rounded elevation which is more densely pilose; the first tarsal joint is also similarly more densely pilose on the dorsal surface at the distal end than elsewhere and sometimes is weakly clavate. The femur somewhat thicker than in the female and also clavately widened distad.

Gonopods of female with claw but moderately bent; the two lateral lobes but little proximad of level of median; occasionally one of the lateral lobes may be replaced by two so that there are four divisions instead of the usual three. The outer of each pair of spines considerably larger than the inner and often bifid distally; spines subcylindric with acuminate distal portion short and commonly blunt; the inner spine may be bent mesad at tip.

For appearance of gonopods of male, see Plate 1, fig. 2.

Length 15 to 27 mm. The antenna in specimens from 24 to 26 mm. long is from 11 to 12 mm. long, the anal legs exclusive of coxa being from 9 to 11 mm. long. A ♀ 26 mm. long has the tenth (and eighth) dorsal plate 3.3 mm. wide; a ♂ 19 mm. long has the tenth (and eighth) dorsal plate 2.8 mm. wide.

*Immaturus*.—Light brown in life, often having something of a violaceous tinge. Head light reddish brown or chestnut. Antennae and last pair of legs pale, yellowish distad.

Antennae with the twenty articles present, of nearly same proportions as in adult.

Eyes composed of seventeen to nineteen ocelli in 4 series; *e.g.*, 1 + 5, 5, 4, 2.

Prosternal teeth 6 + 6. Spines slender and pale. Chitinous lines distinct, complete or nearly so.

Three joints of female gonopods present, the claw indicated merely as a chitinous point to the distal joint. Second joint with two or three bristles, the first with from five to seven, the last with one or two. Coxal pores small, mostly in but two series, those of caudal row largest, six to twelve in number.

Spines of first legs,  $\frac{0, 0, 2, 1, 1}{0, 0, 2, 3, 2}$ ; spines of second legs,  $\frac{0, 0, 3, 2, 1}{0, 0, 2(1), 3, 1}$ ; of third to seventh,  $\frac{0, 0, 3, 2, 1}{0, 0, 2, 3, 1}$ ; of eighth to tenth,  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$ ; of the eleventh,  $\frac{0, 0, 3, 2, 2}{0, 0, 3(2), 3, 2}$ ; of the twelfth,  $\frac{1, 0, 3, 1, 1}{0, 0, 3, 3, 2}$ ; of the thirteenth,  $\frac{1, 0, 3, 1, 1}{0, 1, 3, 3, 2}$ ; of the anal,  $\frac{1, 0, 3, 1, 0}{1, 1, 3, 2, 1}$ . Ventral spines of last two pairs of coxae strongly developed as also the lateral and dorsal.

Length of specimen described, 12 mm.

*Agenitalis* (♂).—Light violet-brown. Head more reddish. Antennae and last legs paler, yellowish.

Prosternal teeth 5 + 5. Spines pale, slender.

Ocelli about eight in two series; *e.g.*, 1 + 4, 3.

The twenty articles of antennae already present, varying in length, the shorter ones occurring at intervals.

Angles of dorsal plates produced as in adults, but the processes of the sixth weaker.

Coxal pores on anal coxae two in one series; on others in two series, four or five in number, three of caudal or ventral row largest as usual.

Gonopods small, wart-like, glabrous.

Spines of first legs,  $\frac{0, 0, 0, 1, 1}{0, 0, 1(0), 1, 0}$ ; of second,  $\frac{0, 0, 1, 1, 1}{0, 0, 2, 1, 1}$ ; of third,  $\frac{0, 0, 2, 2, 1}{0, 0, 2, 1, 1}$ ; of fourth,  $\frac{0, 0, 1, 2, 1}{0, 0, 2, 2, 1}$ ; of fifth to ninth,  $\frac{0, 0, 2, 2, 1}{0, 0, 2, 2, 1}$ ; of tenth and eleventh,  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 2, 1}$ ; of twelfth,  $\frac{0, 0, 1, 3, 1, 1}{0, 1, 2, 2, 1}$ ; of thirteenth,  $\frac{1, 0, 3, 1, 1}{0, 1, 1, 2, 1}$ ; of fourteenth,  $\frac{1, 0, 3, 1, 1}{1, 1, 3, 2, 0}$ ; of anal,  $\frac{1, 0, 3, 1(0), 0}{1, 1, 3, 2, 0}$ .

Length of specimen described *cir.* 9 mm.

TYPE LOCALITY.—New York.

KNOWN LOCALITIES.—Massachusetts (Warwick!). New Hampshire (Marlow). New York (Ithaca! Penn Yan! Albany! Thousand Is.). Ohio (Columbus! Kelly's Island!). Indiana (abundant throughout the state). Michigan (Ludington, Ann Arbor! Lansing! Douglas Lake!). Illinois (Franklin Grove! Peoria!). Pennsylvania (Philadelphia!). New Jersey!. District of Columbia (Washington!). Maryland. Delaware. Kentucky (near Mammoth Cave! Osceola! Greensburg!). Tennessee (Beaver Creek, Mossy Creek, Nashville! Knoxville! Russellville!). Virginia (Machaville, Natural Bridge! Chatham! Balcony Falls!). West Virginia (White Sulphur!). North Carolina (Catawba! Chapel Hill! Morgantown!). South Carolina. Georgia!. Florida (Palatka!). Alabama (Maplesville! Jackson!). Mississippi (Canton! Fernwood! Byram!). Arkansas (Little Rock!). Louisiana!.

In this widespread species, considerable variation occurs. Variation in the spining of the legs is apparently more frequent than in related species, as noted particularly on the twelfth and thirteenth pairs where an extra or caudal spine occurs on the fourth or on the fourth and fifth articles raising the dorsal formula to 1, 0, 3, 2, 1 or 1, 0, 3, 2, 2 in place of the typical and much more frequent 1, 0, 3, 1, 1. Specimens collected at Franklin Grove, Ill., have a considerably larger proportion with the increased number of spines on these legs than in those from other localities studied, this variation in most places appearing to be rare.

#### BOTHROPOLYS COLUMBIENSIS, sp. nov.

DESCRIPTION.—Dorsum brown, with the caudal plates light ferruginous. Head also of pale ferruginous cast with the frontal region lightest. Antennae pale brown, lightest distally. Prosternum pale ferruginous, with the prehensors lighter, more yellowish. Venter brown, the caudal plates light ferruginous. Legs yellowish brown, brighter distad; caudal pairs light ferruginous.

Body rather slender, being nearly nine times longer than the width of the tenth plate. Ratio of width of head to that of first, third, eighth, and tenth dorsal plates as 44 : 40 : 39 : 44 : 44.

Head slightly longer than wide (45 : 44); widest immediately caudad of the eye, the sides incurved at level of suture and then moderately converging caudad to the well-rounded corners. Caudal margin straight or nearly so. On caudal region a narrowly V-shaped impression with the apex caudad and more or less extended as a median sulcus; ectad of each arm of the V-shaped impression are two or three longitudinal sulci. A V-shaped impression on frontal portion of head with the point a little in front of suture and the arms diverging cephalad. A weaker transverse constriction extending straight across frontal region from near lateral ends of frontal suture.

Eyes composed of sixteen ocelli in three series: thus, 1 + 6, 5, 4. The single ocellus not very large. Ocelli well spaced, regular, decreasing in size cephalad and ventrad as usual.

Antennae short, reaching to the seventh segment. Articles twenty, moderate in size and uniform.

Prosternum in type 1.54+ times wider than long. Distance between chitinous spots 1.9 times width at mesal incision, 2.53 times the dental line. Mesal incision moderate V-shaped, with the sides somewhat flaring. Teeth of moderate size, nearly uniform, the outer ones a little larger and a little more widely spaced; 6 + 6 in number. Spine moderately stout at base a little above which it is constricted then running out into a fine bristle-like distal portion.

First dorsal plate widest at anterior end with the sides moderately converging to the rounded caudal corners: 1.8 times wider than long; with two pairs of longitudinal furrows ending about one third the length of plate from caudal margin; a weak transverse furrow near caudal ends of longitudinal ones. Other plates mostly with two submedian longitudinal sulci and each side of these two deeper furrows which converge caudad and commonly meet at an acute angle. Posterior angles of sixth, seventh, ninth, eleventh, and thirteenth dorsal plates produced, but those of the sixth only weakly so, those of the seventh more distinct but with the mesal edge long.

Coxal pores in three or four series of which the most caudal is longest and composed of largest pores as usual.

Spines of first and second legs,  $\begin{smallmatrix} 0, 0, 3, 2, 1 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$ ; of third to ninth inclusive,  $\begin{smallmatrix} 0, 0, 3, 2, 2 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$ ; of tenth and eleventh,  $\begin{smallmatrix} 0, 0, 3, 2, 2 \\ 0, 0, 3, 3, 2 \end{smallmatrix}$ ; of the twelfth,  $\frac{1(0), 0, 3, 1, 1}{0, 1, 3, 3, 2}$ ; of the thirteenth,  $\begin{smallmatrix} 1, 0, 3, 1, 1 \\ 0, 1, 3, 3, 2 \end{smallmatrix}$ ; of the penult,  $\begin{smallmatrix} 1, 0, 3, 1, 1 \\ 1, 1, 3, 3, 1 \end{smallmatrix}$ , a very small accessory claw present; of the anal,  $\begin{smallmatrix} 1, 0, 3, 1, 0 \\ 1, 1, 3, 2, 1 \end{smallmatrix}$ , the claw single. Last two pairs of coxae laterally armed.

Anal legs in female of moderate length, slender, dorsally longitudinally sulcate.

Claw of female gonopods tripartite as usual, the lobes of usual relations. Basal spines conical, somewhat rounded at tips.

Length 15 mm.; length of antennae 6.6 mm.; of anal legs 6 mm.; width of tenth plate, 1.68 mm.

LOCALITY.—British Columbia (Kaslo!).

The type (M. C. Z. 672) is a female in the late *pseudomaturus* stage.

This species is very close to *multidentatus* (Newport) but differs especially in proportion of body, head, and prosternum. The head is longer than wide whereas in the other species it is conspicuously wider than long; and the prosternum is but 1.54 times wider than long as against 1.8 times in *multidentatus*. The coloration of the two species is different.

#### POROPOLYS, subgen. nov.

#### BOTHROPOLYS HOPLES (Brolemann).

Plate 2, fig. 9. Plate 3, fig. 1-4.

*Lithobius (Bothropolys) hoples* Brolemann, Ann. Soc. ent. France, 1896, 65, p. 45.

*Lithobius hoples* Chamberlin, Ann. Ent. soc. Amer., 1909, 2, p. 191.

*Bothropolys hoples* Chamberlin, Can. ent., 1912, 44, p. 173.

DESCRIPTION.—Dorsum from brown, with the head and the first and last segments reddish, to light chestnut in specimens in full color, the head being then not at all or but little darker. A median longitudinal stripe with on most of the major plates one or two fainter somewhat oblique marks each side of it testaceous, these light lines extending about two thirds the length of the plate; caudal borders and minor plates often also testaceous. Antennae brown to light chestnut proximally, becoming yellow distad. Prosternum and prehensorial feet colored like the head. Venter and legs testaceous, the last segments darker, often chestnut, the anal pair of legs also darker, in fully colored specimens light chestnut.

Robust, being from 7 to 8.25 times longer than width of tenth plate. The first dorsal plate in the male is as wide as or mostly a little wider than the eighth and tenth, but in the female it is always distinctly narrower; the ratio of width of first, eighth, tenth, and twelfth plates is typically near 68 : 67 : 67 : 64 in the male, and 64 : 68 : 68 : 66 in the female.

The head is wider than long in about the ratio 5 : 4.5. Sides nearly straight from immediately back of the eyes to the rounded caudal corners, slightly converging; caudal margin straight between the rounded corners or mesally very weakly incurved. A short, deep, curved mark running mesocaudad from each margin at about one third the distance from the caudal corner and a slightly curved and mostly suboval furrow or pit on each side immediately in front of the caudal margin. There is a faint impression a little caudad of and parallel with the frontal suture, the space between it and the suture free or nearly free of puncta. Lightly, and not densely punctate.

Ocelli in an elongate patch, black, uniform, and compactly arranged. Ocelli from twenty-seven to thirty-seven, arranged in five series; *e.g.*, 1 + 8, 9, 7, 7, 5; 1 + 5, 7, 6, 5, 4; 1 + 6, 7, 6, 4, 3; 1 + 7, 7, 4, 3; 1 + 7, 8, 6, 5, 3; 1 + 6, 7, 6, 5, 4.

Antennae short, reaching the sixth segment or sometimes the seventh. Composed of twenty to twenty-three rather long articles which do not vary much in their proportions. Clothed with relatively short hairs.

Prosternum with chitinous lines indistinct or absent caudad. Near 1.6 times wider than long. Mesal incision narrow, the sides weakly inclined. Distance between chitinous spots about 2.5 times the dental line and two times the width at bottom of mesal incision. Teeth 8 + 8 to 10 + 10, often with different number on the two sides, as in other species, as 8 + 9, 8 + 10, etc., outer teeth on each side a little wider apart than the mesal ones. Spine attenuated to a bristle-like apical portion which is commonly dropped off from fully grown specimens, leaving the spine blunt.

The middle portion of the dorsal plates is nearly smooth, the lateral portions rugose. The first, third, fifth, eighth, tenth, twelfth, and often the fourteenth plates showing a distinct transverse or subtransverse sulcus adjacent to each lateral margin at about one third the length from the caudal margin corresponding to the one on the head; the seventh is marked with a deeper curved furrow near each caudolateral corner and also with an impression near each cephalolateral corner. Posterior angles of ninth, eleventh, and thirteenth dorsal plates strongly produced, the processes acute.

Entire surface of first ventral plate depressed concavely; the others nearly all showing three longitudinal and parallel impressions which are rather wide and shallow furrows of which the median is deeper than the others and is ordinarily of a subcircular outline and lies caudad of middle of plate; on the fourteenth and fifteenth plates the lateral

impressions, especially in the male, converge and caudally bend mesad and usually unite in a transverse furrow which the median impression also meets.

Spines of first to sixth pairs of legs,  $\begin{smallmatrix} 0, 0, 3, 2, 2 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$ ; of the seventh,  $\begin{smallmatrix} 0, 0, 3, 2, 2 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$  to  $\begin{smallmatrix} 1, 0, 3, 2, 2 \\ 0, 0, 3, 3, 2 \end{smallmatrix}$ ; of the eighth to tenth,  $\begin{smallmatrix} 0, 0, 3, 2, 2 \\ 0, 0, 3, 3, 2 \end{smallmatrix}$  or  $\begin{smallmatrix} 1, 0, 3, 2, 2 \\ 0, 0, 3, 3, 2 \end{smallmatrix}$ ; of the eleventh,  $\begin{smallmatrix} 1, 0, 3, 2, 2 \\ 0, 0, 3, 3, 2 \end{smallmatrix}$ ; of the twelfth and thirteenth,  $\begin{smallmatrix} 1, 0, 3, 1, 1 \\ 0, 1, 3, 3, 2 \end{smallmatrix}$ ; of the penult,  $\begin{smallmatrix} 1, 0, 3, 1, 1 \\ 1, 1, 3, 3, 1 \end{smallmatrix}$ , the accessory claw minute or absent; of the anal,  $\begin{smallmatrix} 1, 0, 3, 1, 0 \\ 1, 1, 3, 2, 1 \end{smallmatrix}$ , claw single. Last two pairs of coxae laterally armed.

Anal legs long and slender, the third article broadly furrowed longitudinally on the ventral surface. The third, fourth, fifth, and sixth articles longitudinally furrowed subdorsally, the furrow being most distinct on the fourth and fifth articles at distal ends and being faint on the sixth. A ventral furrow on the third joint is present also in the penult legs but it is less marked than in the anal. Legs of male not specially modified.

Gonopods of male appearing as rounded projections of moderate size bearing seven or eight bristles.

Claw of gonopods of female moderately short, tripartite, the three teeth not much differing in size. Outer of each pair of spines larger than the inner; spines thickest at base, moderately and uniformly converging to the short acuminate apical portion (Plate 2, fig. 9; Plate 3, fig. 1-3).

Length from 20 to 40 mm. In a male 40 mm. in length the antennae are 17.5 mm. long; anal legs 16 mm. long; width of first dorsal plate 5.1 mm.; of eighth and tenth 5 mm.; of twelfth 4.5 mm.

*Pseudomaturus*.—Coloration similar to that of adult but somewhat paler throughout.

Ocelli near twenty-one in four series; 1 + 6, 6, 5, 3 (2); 1 + 7, 5, 5, 3 (2).

Antennae as in *maturus*.

Prosternal teeth 7 + 7.

Spining of legs as in *maturus*.

Coxal pores mostly fifteen to twenty in three series or with a fourth series unevenly developed.

Gonopods in female with claw a little thinner than in *maturus* and hairs somewhat fewer. Spines of the characteristic shape but the inner one of each pair proportionately more slender and somewhat shorter.

Length 16-18 mm. (Kaslo, British Columbia).

*Praematurus*.—Coloration uncertain because of long preservation.

Eyes consisting of about sixteen ocelli in three or four series; e.g., 1 + 6, 5, 3, 1; 1 + 6, 4, 3, 2.

Antennae composed of the full twenty articles which are mostly uniform and relatively somewhat shorter than in the adult.

Prosternal teeth 7 + 7. Spine stout at base, running out to a bristle-like apical portion.

Spines of first legs,  $\frac{0, 0, 3, 2, 1}{0, 0, 2, 3, 1}$ ; of the second  $\frac{0, 0, 3, 2, 1}{0, 0, 2, 3, 2}$ ; of the third to ninth,  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$ ; of the tenth and eleventh,  $\frac{0, 0, 3, 2, 2}{0, 0, 3, 3, 2}$ ; of the twelfth and thirteenth,  $\frac{1, 0, 3, 1, 1}{0, 1, 3, 3, 2}$ ; of the penult  $\frac{1, 1, 3, 3, 1}{1, 1, 3, 3, 1}$ ; of the anal,  $\frac{1, 1, 3, 2, 2}{1, 1, 3, 2, 2}$ .

Coxal pores in two or three series, ten to fifteen in number, those of most anterior row commonly very small.

Claw of female gonopods very short and pale; but slightly bent; tripartite, the lateral teeth weak and much shorter than the acute median division. Basal spines 2 + 2, but the inner one of each pair much more slender than the stout conical outer one and only about half as long.

Length *cir.* 15 mm.; length of antennae 7 mm.; of anal leg *cir.* 6.5 mm.

TYPE LOCALITY.— Washington.

KNOWN LOCALITIES.— Washington. Oregon (Portland!). British Columbia (Kaslo!). Montana (Flathead Lake!). Idaho (Kootenai Co.!).

This large species is common in the Northwest. The marked sexual dimorphism shown in the proportions of the body is very interesting and is not paralleled in any other known North American species either of *Bothropolys* or of *Ethopolys*.

As indicating the extent to which the antennae may occasionally vary, it may be mentioned that in a specimen from Idaho the left antenna reaches only to the fifth segment, while the right one extends to the eighth segment, the number of articles, nevertheless, being the same on the two sides.

### BOTHROPOLYS PERMUNDUS (Chamberlin).

Plate 2, fig. 1-8.

*Lithobius permundus* Chamberlin, Proc. Acad. nat. sci. Phil., 1902, p. 42.

*Lithobius xanti* Chamberlin (*ex parte*), Proc. U. S. N. M., 1901, 24, p. 24.

*Bothropolys permundus* Chamberlin, Can. ent., 1912, 44, p. 173.

DESCRIPTION.— Dorsum brown, the head with the last few and also often the first or first few dorsal plates rust-brown or ferruginous; middle portion of dorsum sometimes very dark, dusky, and part of the plate often with a median longitudinal blackish stripe with some-



times, especially on the more caudal plates, a pale oblique line on each side. Legs brown to testaceous, the tarsi, as usual, more brightly colored, light orange; last pairs of legs light orange in color. Antennae brown to orange, usually lighter distad. Venter brown, with the last several plates ferruginous. Prosternum and prehensorial feet pale ferruginous.

Body from 7.6 to 8 times longer than the width of the tenth plate. Widest as usual at eighth and tenth plates; narrowed conspicuously caudad and but little cephalad; the first plate in both male and female clearly narrower than the eighth and tenth. The width of first, eighth, tenth, and twelfth plates in a male are to each other as 58 : 63 : 63 : 60; in a female as 61 : 62 : 62 : 62, the female being more uniform.

Head wider than long in about ratio 13 : 12. Of usual shape; sides converging considerably from immediately back of eyes caudad. A rather sharply impressed curved furrow a little caudad of and parallel with the frontal suture, this furrow not extending over the lateral portions of head. The usual short transverse furrow over each lateral border at beginning of caudal third of length. Head polished, the puncta few and scattered.

Eyes composed of fifteen to twenty-five ocelli in three to five series. Single ocellus of moderate size, subcircular, typically contiguous with first one of dorsal row. Seriate ocelli small, compactly grouped. Examples of arrangements are 1 + 6, 5, 3; 1 + 5, 5, 4, 3; and 1 + 6, 5, 4, 3.

Antennae usually reaching to the seventh segment. Composed of from twenty to twenty-three articles, all of which are moderately long and do not vary much among themselves in proportions. Hairs moderately long.

Prosternum near 1.6 times wider than long. Chitinous lines very faint. Mesal incision with sides considerably converging, the sinus at bottom narrowly rounded. Teeth nearly uniform in size and spacing, or the outer ones more widely separated than the inner. Teeth 7 + 7 to 9 + 9. Spine of usual acuminate form, the bristle-like tip commonly lost in adults leaving the basal portion bluntly tipped.

Dorsal plates polished, not rugose being roughened only by the furrows mentioned below. The first, third, fifth, eighth, tenth, twelfth, and fourteenth plates with the usual short submarginal sulcus on each side near beginning of caudal third of length, the seventh with similar impressions at each caudal and each anterior corner. Each major plate excepting the first or the first and third with a median and on

each side a lateral longitudinal furrow which are least distinct on the anterior plates; often also an oblique furrow on each side running from near the anterior end of median furrow ectocaudad and meeting the outer longitudinal furrow at an angle. Posterior angles of ninth, eleventh, and thirteenth dorsal plates strongly produced, those of sixth and seventh obliquely truncate or excised.

Ventral plates with the usual three longitudinal furrows which increase in distinctness from anterior to posterior regions and may be almost obliterated on first plates; the median impression on the more anterior segments is often pit-like; a transverse furrow a little in front of caudal margin may or may not be evident. Typically in the male the three furrows on the last three plates extend distinctly across the plate, the two lateral converging and meeting upon the median one in an acute angle in front of the caudal end of the latter or else connected across it by a transverse furrow.

Coxal pores varying in size as usual with those of the most caudal series and at the distal end largest; arranged in three or four series and mostly from twelve to twenty-seven in number on each coxa.

Spines of first to fifth legs,  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$ ; of sixth and seventh,  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$ ; of the eighth and ninth,  $\frac{0, 0, 3, 2, 2}{0, 0, 3, 3, 2}$ ; of the tenth,  $\frac{1(0), 0, 3, 2, 2}{0, 0, 3, 2, 2}$ ; of the eleventh,  $\frac{1, 0, 3, 2, 2}{0, 0, 3, 3, 2}$  or  $\frac{1, 0, 3, 2, 2}{0, 1, 3, 3, 2}$ ; of the twelfth and thirteenth,  $\frac{1, 0, 3, 1, 1}{0, 1, 3, 3, 2}$  or  $\frac{1, 0, 3, 1, 2}{0, 1, 3, 3, 2}$ ; of the penult,  $\frac{1, 0, 3, 1, 1}{1, 1, 3, 3, 1}$ , with one small accessory claw; of the anal,  $\frac{1, 0, 3, 1, 0}{1, 1, 3, 2, 1}$ , claw 1. Last two pairs of coxae laterally armed.

In the female the anal legs are of medium length and slender. In the male the fourth, fifth, and sixth articles are somewhat more thickened, the sixth or first tarsal joint being commonly conspicuously thicker than the seventh joint; the fourth and fifth joints are slightly complanate above and more densely clothed with the fine short hairs on dorsal side toward distal end.

Gonopods of male consisting of one subcylindric, distally rounded or sometimes obliquely subtruncate article which bears seven or eight bristles.

Claw of female gonopods of moderate length, not strongly curved, tripartite, with the lobes nearly equal in length and form. Basal spines subuniformly acuminate from very base the apical portion longer and more slender and more acute than usual. Outer spine largest (Plate 2, fig. 8).

Length from 19 to 27 mm. In a female 20 mm. long the antennae are 9.8 mm. long; the anal legs, exclusive of coxa, 8 mm.; width of first dorsal plate 2.4 mm.; of the tenth plate 2.6 mm.

*Pseudomaturus*.—Dorsum brown with margins of major plates often

darkened; head and caudal segments light ferruginous, the former somewhat dusky caudad of the frontal suture. Antennae brownish or somewhat ferruginous proximally, yellowish distad. Prehensorial feet pale orange, the prosternum a little darker. Venter light brown, the last few segments subferruginous. Legs light brown, pale orange at tips. Last pair of legs light orange excepting proximad.

Ocelli fewer in number than in *maturus* but of same proportion and arrangements such as 1 + 5, 5, 4.

Antennae composed of twenty to twenty-two articles; when of the larger number some of the more distal articles short, apparently from subdivision of larger articles; when twenty moderately long and decreasing in length distad from the second to the penult.

Prosternal teeth mostly 6 + 6. Spine as in adult, but tip more usually present. Chitinous lines distinct.

Coxal pores eight to fourteen in two or three series, the more cephalic ones very small or some minute.

Spines of first legs,  $\begin{smallmatrix} 0, 0, 3, 2, 1 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$ ; of the second to the seventh,  $\begin{smallmatrix} 0, 0, 3, 2, 2 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$ ; of the eighth and ninth,  $\begin{smallmatrix} 0, 0, 3, 2, 2 \\ 0, 0, 3, 3, 2 \end{smallmatrix}$ ; of the tenth and eleventh,  $\begin{smallmatrix} 1, 0, 3, 2, 2 \\ 0, 1, 3, 3, 2 \end{smallmatrix}$ ; of the twelfth,  $\begin{smallmatrix} 1, 0, 3, 1, 1 \\ 0, 1, 3, 3, 2 \end{smallmatrix}$  or  $\begin{smallmatrix} 1, 0, 3, 1, 2 \\ 0, 1, 3, 3, 2 \end{smallmatrix}$ ; of the thirteenth,  $\begin{smallmatrix} 1, 0, 3, 1, 1 \\ 0, 1, 3, 3, 2 \end{smallmatrix}$ ; of the penult,  $\begin{smallmatrix} 1, 0, 3, 1, 1 \\ 1, 1, 3, 3, 1 \end{smallmatrix}$ ; of the anal,  $\begin{smallmatrix} 1, 0, 3, 1, 0 \\ 1, 1, 3, 2, 1 \end{smallmatrix}$ .

Gonopods of female nearly as in adult, but claw less strongly chitinized; of about equal width distad and proximad; teeth appearing as crenations of about same length, but middle one broader. Spines nearly as in adult but the inner proportionately to the outer one a little more reduced.

Length 14 to 17 mm. long. A female 15.5 mm. long has antennae 6.5 mm. long, and anal legs 7 mm. long.

*Praematurus*.—Light brown commonly of more or less violaceous tinge, head light ferruginous, the caudal segments more yellowish. Prosternum and prehensorial feet and the most caudal ventral plates yellowish or weak orange tinge. Antennae yellow distad. Legs pale, the caudal pairs yellow or yellowish orange.

Ocelli 1 + 5, 3, 2; 1 + 5, 4, 2. Compact, the single one contiguous, not much different in size.

Articles of antennae already twenty, a little shorter than in adult.

Prosternal teeth 5 + 5, uniformly spaced, lips narrowly rounded, black. Spine long, bristle-like at tip. Chitinous lines very distinct.

Coxal pores in two rows, those of the anterior one often relatively very small or minute, the distal pore of the caudal row being much the largest.

Spines of first and second legs,  $\begin{smallmatrix} 0, 0, 3, 2, 1 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$ ; spines of third to eighth

pairs,  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$ ; of ninth to eleventh,  $\frac{0, 0, 3, 2, 2}{0, 0, 3, 3, 2}$ ; of the twelfth, and thirteenth,  $\frac{1, 0, 3, 1, 1}{0, 1, 3, 3, 2}$ ; of the penult,  $\frac{1, 0, 3, 1, 1}{1, 1, 3, 3, 1}$ ; of the anal,  $\frac{1, 0, 3, 1, 0}{1, 1, 3, 2, 1}$ .

Gonopods of male appearing as pale rounded processes bearing two or three bristles.

Claw of female gonopods brown, short and thin; the middle lobe clearly longer than the lateral ones, acute; the lateral teeth small, acute, and toward base of claw. Basal spines 2 + 2, with the inner one of each pair much shorter and more slender than the outer.

Length of a female 14 mm., with anal legs 5.5 mm., and antenna 4 mm. long. A male is 12 mm. long.

*Immature*.—Pale brown, frequently with a strong violaceous tinge showing through from beneath. Head and last segments above and beneath rust-yellow or light orange. Last pairs of legs yellowish.

Ocelli 1 + 5, 4 to 1 + 5, 4, and 1 + 5, 4, 2 or 1 + 5, 3, 1; the anterior ones pale, whitish.

Prosternal teeth 4 + 5 or 5 + 5; the outermost on each side largest. Spine slender, bristle tipped. Chitinous lines strongly evident.

Articles of antennae twenty, shorter than in the adult; often in part somewhat moniliform.

Posterior angles of ninth, eleventh, and thirteenth dorsal plates already strongly produced.

Coxal pores mostly in a single series, but sometimes with one or two in a second more anterior row; small, margins pale; from four to seven on each coxa.

Spines of first legs,  $\frac{0, 0, 3 \text{ (2)}, 2, 1}{0, 0, 2, 2, 1}$ ; of the second,  $\frac{0, 0, 3, 2, 1}{0, 0, 2, 3, 2}$ ; of the third to fifth,  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$  or sometimes,  $\frac{0, 0, 3, 2, 1}{0, 0, 2, 3, 2}$ ; of the sixth and seventh,  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$ ; of the eighth and ninth,  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$  or  $\frac{1, 0, 3, 2, 2}{0, 0, 2, 3, 2}$ ; of the tenth,  $\frac{0, 0, 3, 2, 2}{0, 0, 3, 3, 2}$  or  $\frac{1, 0, 3, 2, 2}{0, 0, 3, 3, 2}$ ; of the eleventh,  $\frac{1, 0, 3, 2, 2}{0, 0, 3, 3, 2}$ ; of the twelfth and thirteenth,  $\frac{1, 0, 3, 1, 1}{0, 1, 3, 3, 2}$ ; of the penult,  $\frac{1, 0, 3, 1, 1}{1, 1, 3, 3, 1}$ ; of the anal,  $\frac{1, 0, 3, 1, 0}{1, 1, 3, 2, 1}$ .

In the gonopods of the female the three joints are distinct. The distal article short and apically more or less rounded, the claw being either not evident or else indicated merely as a minute point. The first article with three or four bristles, the second with two and the third with one on the ventral surface. Basal spines 1 + 1, very small, acutely conical, pale.

Length 8.5 to 11 mm. A specimen *cir.* 9.8 mm. long has antennae 3.7 mm. and anal legs 4 mm. long.

*Aeguitalis*.—Very pale yellowish, conspicuously violaceous. Head brighter yellow, in front of suture. Anal legs whitish at distal ends.

Ocelli 1 + 3, 2; well separated from each other; pale. Single ocellus but slightly larger than the adjacent one. Organ of Tomösvary

elliptical, with outline as large as an ocellus; situated cephaloventrad of anterior eye of ventral row.

Articles of antennae twenty, shorter than in the older stages, submoniliform.

Prosternal teeth  $5 + 5$ ; small, the innermost smaller than the others; but little darkened at tips. Spine slender, bristle-like above base. Chitinous lines indistinct.

Coxal pores pale and small, increasing in size distad. In a single series; *e.g.*, 2, 3, 3, 2.

Spines of first legs,  $\begin{smallmatrix} 0, 0, 0, 1, 1 \\ 0, 0, 0, 1, 1 \end{smallmatrix}$ ; of the second and third,  $\begin{smallmatrix} 0, 0, 1, 1, 1 \\ 0, 0, 0, 1, 1 \end{smallmatrix}$ ; of the fourth and fifth,  $\begin{smallmatrix} 0, 0, 2, 2, 1 \\ 0, 0, 0, 1, 1 \end{smallmatrix}$  or  $\begin{smallmatrix} 0, 0, 2, 2, 1 \\ 0, 0, 1, 1, 1 \end{smallmatrix}$ ; of the sixth to the eleventh,  $\begin{smallmatrix} 0, 0, 2, 2, 2 \\ 0, 0, 1, 2, 1 \end{smallmatrix}$ ; of the twelfth,  $\begin{smallmatrix} 0, 0, 2, 1, 1 \\ 0, 0, 1, 2, 1 \end{smallmatrix}$  or  $\begin{smallmatrix} 0, 0, 2, 1, 1 \\ 0, 0, 2, 2, 1 \end{smallmatrix}$ ; of the thirteenth,  $\begin{smallmatrix} 1, 0, 2, 1, 1 \\ 0, 1, 2, 2, 1 \end{smallmatrix}$ ; of the penult,  $\begin{smallmatrix} 1, 0, 2, 1, 1 \\ 0, 1, 3, 2, 0 \end{smallmatrix}$  or  $\begin{smallmatrix} 1, 0, 2, 1, 0 \\ 0, 1, 3, 2, 0 \end{smallmatrix}$ ; of the anal,  $\begin{smallmatrix} 1, 0, 2, 0, 0 \\ 1, 1, 3, 2, 0 \end{smallmatrix}$ .

Gonopods of the female biarticulate; the distal article conical. Each article with one bristle. The distal article may show trace of subdivision line for formation of the third article.

A specimen 7.5 mm. long has the anal legs *cir.* 3.5 mm. and the antenna *cir.* 4 mm. long.

KNOWN LOCALITIES — Utah (canyons of the Wahsatch Mountains at lower and middle elevations throughout the range: the Weber! Farmington! City Creek! Mill Creek! Little and Big Cottonwood! American Fork! Provo! Spanish Fork! etc.).

In and about the more thickly populated districts this species tends to be wholly replaced by *Lithobius forficatus* (Linné). The species sometimes occurs in association with *E. xanti* (Wood).

This species is closely allied to *B. hoplei* Brolemann; but aside from its smaller size and usually different color, the ocelli are fewer, being from 15 to 25 in number in three or four series whereas in *B. hoplei* they are from twenty-seven to forty in mostly five series; the spines of the female gonopods are typically characteristically different as shown in the figures; and the male lacks the marked difference in proportions presented by that of *hoplei*, the first dorsal plate being always distinctly narrower than the eighth and tenth.

#### BOTHROPOLYS VICTORIANUS, sp. nov.

Plate 3, fig. 5, 6.

DESCRIPTION.—Brown, the caudal plates darker and of a ferruginous cast. Head paler over the frontal region. Antennae brown, yellow distally. Legs similar in color to corresponding dorsal plates.

Prosternum light brown of ferruginous tinge. Venter brown with the caudal plates more deeply pigmented, of ferruginous cast.

Body slender, in type being about 9.6 times longer than the width of the eighth plate. The first dorsal plate in the female type not much differing in width from the tenth plate.

Head wider than long in the ratio 63 : 61. Widest as usual immediately behind eyes from where the sides converge a little to the rounded caudal corners, a little bent in at level of suture but lateral margin unbroken. Caudal margin slightly incurved at middle. An impressed dot each side of the median line a little caudad of the frontal suture continuous with a fainter furrow extending ectocephalad from it. A small V-shaped impression in front of caudal margin and cephalad of each of its ends a short oblique furrow which indistinctly unites with its fellow also to form a V-shaped outline; there is also a short oblique impression ectad of each arm of the V-shaped mark. A median longitudinal furrow extends forward from the frontal suture.

Ocelli nineteen or twenty in four or five series; *e.g.*, 1 + 5, 5, 5, 3, 1 and 1 + 6, 5, 4, 3.

Antennae short, reaching only to the fifth segment. Composed of twenty articles which are moderately long and subclavate, not much varying among themselves in proportions. Hairs of medium length.

Prosternum between 1.5 and 1.6 times wider than long. Distance between chitinous lines twice the width at level of bottom of median sinus, 2.3+ times the dental line. Teeth 8 + 8, uniform, apically rounded. Spines a little longer than the teeth, stout basally, distally attenuated, bristle-like.

Posterior angles of eleventh and thirteenth dorsal plates distinctly produced, but the processes short; those of the ninth (Plate 3, fig. 5) but weakly and inconspicuously produced, the apex of the process scarcely extending caudad of median portion of the plate. Plates all strongly rugose over the median as well as the lateral portions. Most showing a median longitudinal furrow and a deeper, irregular, longitudinal furrow between the median one and the lateral edge on each side. The major plates with the usual submarginal transverse short sulci near beginning of the caudal third, each of these connecting with a furrow extending obliquely cephalomesad from its inner end.

First and second ventral plates broadly depressed as usual. Others with the three longitudinal impressions much as in *hoples*.

Spines of first legs,  $\frac{0, 0, 3, 2, 1}{0, 0, 2, 3, 2}$ ; of the second to the sixth,  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$ ; of the seventh,  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$  or  $\frac{1, 0, 3, 2, 2}{0, 0, 2, 3, 2}$ ; of the eighth,  $\frac{1, 0, 3, 2, 2}{0, 0, 2, 3, 2}$ ; of the ninth and tenth,  $\frac{1, 0, 3, 2, 2}{0, 0, 3, 3, 2}$ ; of the eleventh,  $\frac{1, 0, 3, 1, 2}{0, 0, 3, 3, 2}$  or  $\frac{1, 0, 3, 2, 2}{0, 0, 3, 3, 2}$ ; of the twelfth

and thirteenth,  $\frac{1, 0, 3, 1, 1}{0, 1, 3, 3, 2}$ ; of the penult,  $\frac{1, 0, 3, 1, 1}{1, 1, 3, 2, 1}$ , claw single; of the anal,  $\frac{1, 0, 3, 1, 0}{1, 1, 3, 2, 1}$  or  $\frac{1, 0, 3, 1, 0}{1, 1, 3, 2, 0}$ , the claw single. Coxae of last two pairs of legs laterally armed. (Note.—The right penult leg of the type specimen has the ventral spines 1, 1, 3, 3, 1; but the lateral spines of the fourth joint are both on the cephalic side, one being thus clearly accessory and not to be reckoned in the normal formula).

The anal legs of the female are moderate in length and slender. The prefemur and femur are weakly longitudinally sulcate dorsally.

The claw of the female gonopods moderately wide; the lobes are acute, the middle one a little the largest, the apices of the lateral ones being but little proximad of that of the median one. Basal spines 2 + 2 or 3 + 2; not acuminate from base, narrowest near middle of length; apical portion very short (Plate 3, fig. 6).

Length 25 mm.; width of eighth plate 2.6 mm.; length of antenna, 10 mm.; of anal leg exclusive of coxa, 8.4 mm.

*Pseudomaturus*.—A little paler throughout than the *maturus*.

Ocelli fourteen in three series; thus, 1 + 6.4, 3.

Antennae as in *maturus* excepting that the ultimate article in specimen studied is proportionately considerably longer.

Prosternal teeth 6 + 6.

Coxal pores fewer than in *maturus*; in two or three series.

Spines of legs as in *maturus*.

Claw of female gonopods as in *maturus* excepting that it is a little more slender. Spines 2 + 2 with the inner one of each pair only about two thirds as long as the outer one and correspondingly more slender. Of same form as in the *maturus*.

Length 15.5 mm.; width of eighth plate 1.6 mm.; length of antennae 6.8 mm.

TYPE LOCALITY.—British Columbia, Vancouver Island (Victoria).

KNOWN LOCALITIES.—Vancouver Island (Victoria! J. E. Benedict coll.) Alaska (Forrester Island! Harold and Ronald Heath).

This species is allied to *B. permundus* and *B. hoplei*, being apparently closest to the latter. So far as indicated by the type specimens (M. C. Z. 675) the species may be very readily distinguished through the character of the processes of the ninth, eleventh, and thirteenth dorsal plates, these being but weakly developed and those of the ninth in particular being almost obliterated. The spines of the female gonopods are of a different form. The species is also distinctly more slender and smaller than the characteristically robust *B. hoplei* which is common in the neighboring parts of Washington and British Columbia. The specimens from Forrester Island agree fully with those from Victoria.

## ZYGETHOPOLYS, gen. nov.

Marginal thickening of head smoothly continuous forward to the eyes as in *Bothropolys*, not interrupted or broken at sides.

Antennae short, reaching seventh segment; articles twenty.

A diastema present in the dental line on each side of prosternum and separating the teeth into two groups. Spine situated in the diastema, well chitinized, stout at base.

Claw of anal legs single; that of the penult legs with a well-developed accessory claw. Ventral spines of anal legs 1, 1, 3, 3, 1.

Coxae of only the anal legs bearing a spine ventrally. Last two pairs of coxae armed laterally.

Gonopods of female with claw bipartite, the lobes equal. Basal spines 2 + 2.

Male unknown.

TYPE.—*Z. nothus*, sp. nov.

As the genus is known from only the female of a single species, it is not possible to speak with entire certainty as to its position other than to remark that it combines features of *Bothropolys* and *Ethopolys* with apparently more in common with the former, under which it might seem justifiable to range it as a subgenus. It is better and clearer, however, at present to keep the group apart. From *Bothropolys* it may be separated at once through the presence of the prosternal diastema. It is also different in having the spining of the anal legs ventrally 1, 1, 3, 3, 1 instead of the 1, 1, 3, 2, 1 (rarely 1, 1, 3, 3, 2) present in all species of *Bothropolys*, in lacking a ventral spine on the penult coxae, and in having the claw of the penult legs with a well-developed accessory spine or claw at base. The claw of the female gonopods is also characteristic in being bipartite with the lobes equal, it being tripartite in all known species of *Bothropolys*. The first dorsal plate also is narrower than the third, an interesting condition not noted in any other species of the *Ethopolidae*.

Outside of the *Ethopolidae*, the only genus of *Lithobioidea* known to the author to have a diastema in the prosternal dental line is *Eremobius*, a new genus typified by *Lithobius provocator* Pocock of the Bermuda Islands.



*ZYGETHOPOLYS NOTHUS*, sp. nov.

Plate 3, fig. 7, 8.

DESCRIPTION.—Dorsum brown, dusky toward edges, the first one and the last several plates a little darker, of slightly reddish or dilute chestnut cast. Head dilute chestnut, dusky especially in a median longitudinal band continuous anteriorly with a narrow curved transverse one a little back of and parallel with the frontal suture between which and the dark band there is a clear area. Antennae dark brown excepting the ultimate article which is abruptly brighter yellow in color. Legs light brown excepting the last two pairs, which are dark, the anal pair especially so but pale along mesal surface. Prosternum and prehensors testaceous. Venter light brown, excepting fourteenth and fifteenth sternites which are much darker, chestnut or dark reddish brown.

Body only about 6.5 times longer than the width of the tenth plate. First dorsal plate narrower than the head and the third plate, the latter distinctly narrower than the eighth and tenth plates. Widths of head and of first, third, eighth, tenth, and twelfth plates to each other as 49 : 46 : 49 : 56 : 57 : 55.

Head wider than long in the ratio 49 : 46. A deeply impressed curved transverse sulcus between eyes and a little distance caudad of the suture, this sulcus consisting of three curved sulci united at ends, each with convexity cephalad. A short and deep semicircular or U-shaped transverse impression a little in front of the caudal marginal thickening. A median longitudinal furrow extending from frontal suture cephalad and bifurcating at anterior end. Surface not punctate.

Eye-patch oblong, composed of twenty-three ocelli arranged in four series: thus, 1 + 6, 6, 6, 4. Single ocellus circular, contiguous with seriate patch. Seriate ocelli more nearly uniform in size than usual, distinct, black.

Antennae short, reaching to the seventh segment. Articles twenty, of moderate size or short. Ultimate article a little longer than the two preceding taken together.

Prosternum 1.9 times wider than long. Distance between chitinous lines 1.9 times the dental line. Spine stout at base, narrowed to an acute point, inserted contiguously to margin. Teeth 2 - 6 + 6 - 2, the most ectal and the most mesal on each side smallest, the others nearly uniform in size. Mesal incision very narrow, acute.



FIG. 2.— Distribution of *Zygethopolys nothus* Chamberlin.

First dorsal plate 1.7 times wider than long. A characteristic semi-circular impression having an end on the anterior margin at about two thirds the distance from the median line to the lateral margin. Other plates moderately and more or less uniformly roughened over the

entire surface, the major ones with the short submarginal transverse sulci found in other species of the tribe but without distinct longitudinal or oblique furrows; a semicircular impression like that of the first plate faintly indicated, this more distinct on the eighth and tenth plates, the impression on the tenth terminating on a second similar but more convex impression. Posterior angles of the ninth, eleventh, and thirteenth dorsal plates produced strongly, others straight.

Ventral plates with three longitudinal furrows, the median one especially becoming more distinct caudad and crossing entire length of plates, the lateral furrows on the fourteenth and fifteenth plates indistinct.

Coxal pores eight to fifteen in two or three series, there being two series on the anal coxae and three on the others.

Spines of first legs,  $\frac{0, 0, 3, 2, 1}{0, 0, 1, 3, 2}$ ; of the second,  $\frac{0, 0, 3, 2, 1}{0, 0, 2, 3, 2}$ ; of the third to ninth,  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$ ; of the tenth and eleventh,  $\frac{1, 0, 3, 2, 2}{0, 0, 3, 3, 2}$ ; of the twelfth to penult inclusive,  $\frac{1, 0, 3, 1, 1}{0, 1, 3, 3, 2}$ , the claw of the penult legs with a well-developed accessory claw; of the anal  $\frac{1, 0, 3, 1, 0}{1, 1, 3, 3, 1}$ , the claw single. Last two pairs of coxae laterally armed.

Anal legs in female moderately long, slender.

Gonopods of female with the claw small; not at all or but slightly curved; rather deeply bipartite with the lobes acute, equal (Plate 3, fig. 7). Basal spines 2 + 2, with the inner one of each pair distinctly smaller than the outer; spines in surface view showing a short, not at all acute, terminal portion and a proportionately long subcylindric basal portion that is somewhat broader distally than proximally (Plate 3, fig. 8).

Length 15 mm.; width of tenth plate, 2.3 mm.; length of antennae 7 mm.; of anal legs, 7.8 mm. Type, M. C. Z. 687.

LOCALITY.—Alaska (Forrester Island!). Collected by Harold and Ronald Heath, May 20–26, 1913.

#### ETHOPOLYS Chamberlin.

Can. ent., 1912, 44, p. 173.

Lateral marginal thickening of head abruptly discontinuous or broken a little back of middle or near caudal end of the longitudinal curved impression back of each eye (Plate 4, fig. 1).

Antennae usually, but not always, rather long and reaching to or beyond the eighth segment. Composed of twenty or rarely of as many as twenty-eight articles.

In the prosternum a well-marked diastema separating an outer group of teeth on each side from a larger inner group with a basally stout but distally slender spine situated in the diastema (Plate 4, fig. 2.)

Claw of anal legs armed with a minute accessory claw or this obsolete or absent; that of the penult legs with two accessory claws.

Coxae of last two pairs of legs each bearing a stout ventral spine as well as a dorsal and a lateral one.

Gonopods of male distinctly biarticulate.

Claw of female gonopods tripartite or entire; when tripartite with the lateral divisions small and situated considerably proximad of the median one. Basal spines 3 + 3 or 4 + 4 or occasionally 4 + 5.

TYPE.—*Ethopolys xanti* (Wood).

In this genus a semicircular impression caudad of each eye is distinct as in the preceding genus. As in *Bothropolys* also there is not great variation in the spining of the legs within the genus, this largely being the same also as for that genus. The dorsal spines of the anal legs are always 1, 0, 3, 1, 0; the ventral 1, 1, 3, 2, 1, the claw with a very small accessory spine or single. Dorsal spines of the penult legs 1, 0, 3, 1, 1, ventral 1, 1, 3, 3, 2, two accessory claws present. Dorsal spines of the thirteenth legs 1, 0, 3, 2, 2, or, more rarely, 1, 0, 3, 1, 1; the ventral, 0, 1, 3, 3, 2. Dorsal spines of the twelfth legs, 0, 0, 3, 2, 2 or 1, 0, 3, 2, 2, or, more rarely, 1, 0, 3, 1, 1; ventral always 0, 1, 3, 3, 2. Dorsal spines of the eleventh legs, 0, 0, 3, 2, 2, or 1, 0, 3, 2, 2; ventral, 0, 0, 3, 3, 2 or rarely 0, 0, 2, 3, 2. Dorsal spines of the second legs, 0, 0, 3, 2, 2; ventral 0, 0, 2, 3, 2. Dorsal spines of first legs 0, 0, 3, 2, 1; ventral 0, 0, 2, 3, 2.

In the species known to belong to this genus either none of the dorsal plates have their posterior angles produced or else those of the ninth, eleventh, and thirteenth are extended. The name *Ethopolys sens str.* may cover the latter group which contains the type, *E. xanti* (Wood), while for the former *Archethopolys*, subgen. nov., with *E. integer* Chamberlin as the type, may be used.

The prosternal spine in the species of this genus seems practically always to retain its slender terminal portion throughout life (Plate 4, fig. 2, 3, 4; Plate 5, fig. 7; Plate 6, fig. 6).

In variations in the specimens of species of this genus resulting in entirety or a marked tendency toward entirety of the claw of the female gonopods, the result is due apparently to reduction in or disappearance of the lateral teeth with coördinate strengthening of the median one, to a removal of the lateral teeth rather than to an evening



FIG. 3.— Distribution of *Ethopolys* Chamberlin.

up such as occurs in *Bothropolys*. The consequence of this is a long, distally acute claw (Plate 5, fig. 8), contrasting with the blunt claw in *Bothropolys* (Plate 2, fig. 7; Plate 3, fig. 1).

*Key to Species of Ethopolys.*

- a. Posterior angles of none of the dorsal plates produced.  
*Archethopolys* subgen. nov.
- b. Only one tooth ectad of the diastema on prosternum; dorsal spines of twelfth legs, 1, 0, 3, 1, 1; antennae short; length 14-18 mm.  
*E. pusio* (Stuxberg).
- bb. Two or more teeth (at least on one side) ectad of diastema on prosternum; dorsal spines of twelfth legs, 1, 0, 3, 2, 2, or 0, 0, 3, 2, 2; antennae long; length, 19-35 mm.
- c. Prosternum normally with only two teeth ectad of diastema, rarely with three; claw of female gonopods always tripartite.
- d. Antennae reaching to or beyond the ninth segment; color yellow to light amber-brown, the head not reddish.  
*E. bipunctatus* (Wood).
- dd. Antennae not extending beyond the eighth segment; color darker brown, commonly in part dusky, head of reddish cast, typically chestnut.....*E. sierravagus* (Chamberlin).
- cc. Prosternum normally with three or four teeth ectad of diastema, only occasionally with but two; claw of ♀ gonopods entire or bipartite.
- d. Head coarsely and conspicuously punctate; claw of female gonopods entire, with no distinctly developed lateral teeth. (Washington, etc.).....*E. integer* Chamberlin.
- dd. Head not punctate, or punctae scarce and fine; claw of ♀ gonopods bipartite (Alaska).....*E. integer alaskanus* Chamberlin.
- aa. Posterior angles of ninth, eleventh, and thirteenth dorsal plates produced.  
*Ethopolys sens.str.*  
 Claw of ♀ gonopods tripartite; prosternum with three or two teeth ectad of diastema.....*E. xanti* (Wood).

## ARCHETHOPOLYS, subgen. nov.

## ETHOPOLYS BIPUNCTATUS (Wood).

## Plate 5, fig. 5.

*Bothropolys bipunctatus* Wood, Journ. Acad. nat. sci. Phil., 1863, new ser., 5, p. 16. Trans. Amer. philos. soc., 1865, 13, p. 153.

*Lithobius (Archilithobius) bipunctatus* Stuxberg, Öfvers. Kongl. vet. akad. Förh., 1875, 32, no. 3, p. 14, 30.

*Lithobius bipunctatus* Chamberlin, Proc. U. S. N. M., 1901, 24, p. 22.

*Ethopolys bipunctatus* Chamberlin, Can. ent., 1912, 44, p. 174.

DESCRIPTION.—This is the palest species of the genus, varying from light amber-brown, with the first one and the last several seg-

ments lighter, to almost clear yellow and uniform or with the last few segments a little darker. Head mostly very dilute orange, faintly dusky caudad of the frontal suture. Antennae very light brownish yellow or yellow proximad and darker distad of proximal third or half of length excepting sometimes at very tip. Prosternum and prehensorial feet and last ventral plates dilute orange or rusty yellow. Last pairs of legs yellow of weak orange or rusty tinge or the tarsi darker and more distinctly orange. Venter over median portion often brownish or dusky, usually clear, yellow cephalad.

Gradually and uniformly narrowed caudad from the tenth plate and also narrowed cephalad of the tenth plate considerably more than in the related species. Head with sides convex, a little converging from the eyes to the marginal breaks and then more strongly than usual rounding and converging mesocaudad to the caudal corners. The usual short median longitudinal impression contiguous with and immediately in front of the median angle of the caudal marginal thickening, with from its anterior end two weak furrows diverging from it cephalad.

Eyes composed of from thirteen to twenty-two ocelli, which are distinct and regular. Series three or four but mostly the latter. Single ocellus much larger than the others, paler, broadly elliptic, not contiguous with other ocelli. The number of ocelli is frequently seventeen in the following arrangement:  $1 + 5, 5, 3, 2$ ;  $1 + 5, 5, 5, 4$ ; and  $1 + 5, 4, 3$ .

Antennae long, usually reaching the ninth segment. Composed of twenty long, subcylindric articles, of which those distad of the proximal three to five are usually more strictly cylindric. Hairs rather short.

Prosternum 1.7 times wider than long. Chitinous lines absent or obscure. Spine attached a little caudad of anterior edge of diastema; attenuated and becoming distally bristle-like, pale. The most frequent number and arrangement of the teeth is  $2 - 6 + 6 - 2$ , *i.e.*, with two teeth ectad of and six teeth mesad of the diastema on each side. Other arrangements are:  $1 - 6 + 6 - 2$ ;  $2 - 5 + 6 - 3$ ;  $1 - 5 + 5 - 3$ ; and in once case even  $4 - 7 + 6 - 4$ .

Posterior angles of none of the dorsal plates produced, those of the ninth, eleventh, and thirteenth being obliquely excised. All major plates roughened, the more posterior ones most strongly so, the first plate, however, being smooth or nearly so. Major plates with one or two longitudinal furrows on each side subparallel with the margin and which may be more or less broken and a third oblique furrow running

from near middle of anterior margin caudoectad and meeting the lateral furrows at an angle; these furrows absent from or very obscure on first plate. First, third, fifth, eighth, tenth, twelfth, and fourteenth plates with the usual short transverse submarginal sulcus on each side near beginning of caudal third of length and all of these plates excepting the first also with a distinct subtransverse impression near each anterior corner; the seventh plate also with two corresponding pairs of impressions but, as usual, the posterior pair of these is near the caudal corners. The minor plates, especially the more caudal ones, with a curved, subtransverse, sulcus at each anterior corner, the impression running somewhat caudomesad with the convexity caudad and mostly covered by edges of major plates; also with a short curved mark at each caudal corner adjacent to marginal thickening.

First ventral plate with two fovea near anterior margin and cephalad of the broad-depression on the more caudal portion of plate, a short transverse deeper furrow occurring in the latter depression. Of the usual three longitudinal impressions the lateral ones show in varying degrees of distinctness; the median may be only obscurely indicated on the anterior plates, while it becomes more distinct on the caudal. On most a transverse depression in front of caudal margin which is commonly distinctly furrow-like on at least the last two plates where it terminates.

Coxal pores twelve to twenty-five in number on each coxa arranged in three or four series. As usual, of varying sizes, those of the most anterior row much smallest and often minute; all circular or subelliptic.

Spines of first legs,  $\frac{0, 0, 3, 2, 1}{0, 0, 2, 3, 2}$ ; of the second to the tenth,  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$ ; of the eleventh,  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$  or  $\frac{0, 0, 3, 2, 2}{0, 0, 3, 3, 2}$ ; of the twelfth,  $\frac{0, 0, 3, 2, 2}{0, 1, 3, 3, 2}$ ; of the thirteenth,  $\frac{0, 0, 3, 2, 2}{0, 1, 3, 3, 2}$  or  $\frac{1, 0, 3, 2, 2}{0, 1, 3, 3, 2}$ ; of the penult,  $\frac{1, 0, 3, 1, 1}{1, 1, 3, 3, 2}$ , two accessory claws present; of the anal,  $\frac{1, 0, 3, 1, 0}{1, 1, 3, 2, 1}$ , claw single.

Anal legs long and slender; those of male not manifestly modified.

Claw of female gonopods long and stout, considerably curved, tridentate distally, the lateral lobes less proximad than usual, the median much stoutest. Basal spines 3 + 3, the outermost a little stouter than the median and the innermost considerably less robust than the median, all often bent a little ectad at tips, black above bases.

The two articles of male gonopods together subconical, the distal article apically rounded. Proximal article mostly with near four bristles and the distal with two.

Length from 19 mm. to 29 or 30 mm. A female 24.5 mm. long has the tenth plate 3.1 mm. wide; the third 2.5 mm. wide; the first at



widest level 2.8 mm. wide; the antennae 15 mm. long; and the anal legs 13 mm. long.

*Pseudomaturus*.—Coloration somewhat paler than the average in adult, the head being more yellow without or with but little of the orange or rusty tinge. Antennae yellow. Anal legs yellow. Other legs often pale dusky brown proximally with tibiae and tarsi yellow. Caudal ventral plates often dusky.

Ocelli about twelve in three series; *e. g.*, 1 + 4, 4, 3; not contiguous. The most caudal ocellus in each of the two upper series considerably larger than others.

Antennae very long, reaching to or a little beyond the ninth segment. Articles twenty, long and mostly strictly cylindric as in the adult.

Prosternal teeth 2 - 5 + 5 - 2, mostly. Spine slender and pale. Teeth regular and uniform, darkened distally. Chitinous lines faint.

Coxal pores in two series, those of the more cephalic one much smaller and generally fewer; six to twelve on each coxa, the distal one of caudal row often very much larger than others.

Spines of first to sixth legs,  $\frac{0, 0, 3, 2, 1}{0, 0, 2, 3, 2}$ ; of seventh to ninth,  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$ ; of the tenth,  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$  or  $\frac{0, 0, 3, 2, 2}{0, 0, 3, 3, 2}$ ; of the eleventh,  $\frac{0, 0, 3, 2, 2}{0, 0, 3, 3, 2}$ ; of the twelfth,  $\frac{0, 0, 3, 2, 2}{0, 1, 3, 3, 2}$ ; of the thirteenth,  $\frac{1, 0, 3, 2, 2}{0, 1, 3, 3, 2}$ ; of the penult,  $\frac{1, 0, 3, 1, 1}{1, 1, 3, 3, 2}$ ; of the anal,  $\frac{1, 0, 3, 1, 0}{1, 1, 3, 2, 1}$ .

Distal article of male gonopods broadly subconic, in specimen described glabrous; first article with two or three bristles.

Length of specimen described 15.5 mm.; of antennae 9.5 mm.; of anal leg 9 mm.

*Immaturus*.—Coloration very similar to that of the *pseudomaturus* but still paler; the antennae palest proximally and at tips, somewhat orange elsewhere. Legs more uniform in color, the tarsi a little brighter; anal legs yellow.

Ocelli six or eight in two or occasionally in three series; *e. g.*, 1 + 3, 2; 1 + 3, 3, 1. The first ocellus of the upper row rather larger than the single ocellus, much larger than other seriate ones. Organ of Tomösvary a little smaller in outline than the smallest ocellus.

Antennae proportionately shorter, reaching only to the eighth segment. Articles twenty or twenty-one all relatively shorter than in the adult and some, occurring mostly in two's at intervals, much shorter, or as many as six of these may be grouped immediately proximad of the ultimate one. Hairs relatively longer than in the adult.

Prosternum with chitinous lines weak but rather more distinct than in the older stages. Teeth 1 - 4 + 4 - 1 or 2 - 4 + 4 - 2 with

the outermost one on each side in the latter case very small. Spine slender and bristle-like above base.

Coxal pores in one series, small with very pale margins; 2, 3, 3, 2 or 2, 3, 3, 3.

Spines of first legs,  $\frac{0, 0, 2, 1, 1}{0, 0, 1, 1, 1}$  to  $\frac{0, 0, 2, 1, 1}{0, 0, 2, 2, 1}$ ; of the second,  $\frac{0, 0, 3, 2, 1}{0, 0, 1, 2, 1}$  or  $\frac{0, 0, 3, 2, 1}{0, 0, 2, 2, 1}$ ; of the third to fifth,  $\frac{0, 0, 3, 2, 1}{0, 0, 2, 3, 1}$ ; of the sixth to eighth,  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 1}$ ; of the ninth to eleventh,  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$ ; of the twelfth,  $\frac{0, 0, 3, 2, 2}{0, 1, 2, 3, 2}$ , the spine of the trochanter minute; of the thirteenth,  $\frac{0, 0, 3, 1, 2}{0, 1, 3, 3, 2}$ ; of the penult,  $\frac{1, 0, 3, 1, 1}{0, 1, 3, 3, 2}$  or  $\frac{1, 0, 3, 1, 1}{1, 1, 3, 3, 2}$ ; of the anal,  $\frac{1, 0, 3, 1, 0}{1, 1, 3, 2, 0}$ .

Second article of male gonopods distinct, rather short, rounded apically, pale and glabrous. Proximal article narrowed from base to second article, where it is of same width as the contiguous portion of the latter, bearing one bristle.

A male 9 mm. long has antennae 5.75 mm. and anal legs 4.25 mm. long.

*Agenitalis*.—Pale brown mesally, whitish towards ends with the first and last segments yellow. Head yellow, whitish caudally. Antennae whitish yellow. Legs pale, the caudal pairs of a yellowish tinge.

Ocelli five in two series; thus, 1 + 2, 2. All pale, the single ocellus smaller than the proximate one of the upper row, all separated from each other. Organ of Tomösvary very small in outline.

Antennae reaching to the seventh segment. Articles seventeen short, the shortest ones occurring at intervals. Hairs relatively longer than in the adult.

Prosternal teeth 1 - 4 + 4 - 1, spine bristle-like above base. Teeth brown above bases, distally rounded, uniform; or the outermost and innermost on each side a little smaller than the others.

Coxal pores 1, 1, 1 or 2, 1, 1, 1.

Spines of first legs,  $\frac{0, 0, 0, 0, 1}{0, 0, 0, 1, 1}$  to  $\frac{0, 0, 0, 1, 1}{0, 0, 1, 1, 1}$ ; of second to seventh,  $\frac{0, 0, 2, 1, 1}{0, 0, 1, 1, 1}$ , the ventral spine of third article minute; of eighth and ninth,  $\frac{0, 0, 2, 1, 1}{0, 0, 1, 2, 1}$ ; of the tenth,  $\frac{0, 0, 2, 1, 2}{0, 0, 1, 2, 1}$ ; of the eleventh,  $\frac{0, 0, 2, 1, 1}{0, 0, 1, 2, 1}$ , of the twelfth,  $\frac{0, 0, 2, 1, 0}{0, 0, 1, 1, 1}$ ; of the thirteenth,  $\frac{0, 0, 0, 0, 0}{0, 0, 1, 1, 1}$ ; of the penult,  $\frac{0, 0, 0, 0, 0}{0, 0, 1, 1, 1}$  or  $\frac{0, 0, 0, 0, 0}{1, 0, 1, 1, 1}$ ; of the anal,  $\frac{0, 0, 0, 0, 0}{1, 0, 1, 1, 0}$ . The spine on the ventral surface of the third article becomes smaller and smaller cephalad, on the first pair being minute and difficult to detect or quite absent.

Gonopods very short and mostly concealed; undivided.

Anal glands still evident.

Length 7.5 mm.; antennae 4.6 mm. long; anal leg 2.8 mm. long.

TYPE LOCALITY.—“United States West of the Rocky Mountains” (George Suckley, collector).

KNOWN LOCALITIES.—Utah (Emigration Canyon! Wildwood. Provo Canyon! Clinton's Cave, near Lake Point! Uintah Mountains! Daniell's Creek!). Nevada!

ETHOPOLYS SIERRAVAGUS (Chamberlin).

Plate 5, fig. 1-4.

*Lithobius sierravagus* Chamberlin, Proc. Acad. nat. sci. Phil., 1903, p. 154.

*Bothropolys monticola* Chamberlin (*ad part. max. non* Stuxberg), Pomona coll. journ. ent., 1910, 2, p. 369.

*Ethopolys sierravagus* Chamberlin, Can. ent., 1912, 44, p. 174.

DESCRIPTION.—Dorsum light to dark brown, commonly dusky and sometimes very dark, the first one and commonly the last two plates commonly of dilute chestnut cast like the head; nearly always on the major plates a pale median longitudinal stripe with one on each side of it extending obliquely ectocaudad; sometimes some or all of the principal plates bordered caudally and laterally with a distinct stripe of blackish. Head from brown of slight reddish cast to dilute or clear chestnut, dusky immediately caudad of the frontal suture. Antennae proximally like the head, distally light brown or yellowish. Legs brown or testaceous, the posterior pairs darker, often of dilute chestnut tinge. Venter brown, the fourteenth and fifteenth plates of chestnut cast. Prosternum and prehensors dilute chestnut.

Body from 7.75 to 8.5 times longer than wide. The first plate in both male and female considerably narrower than the tenth. Widths of head and of first, third, eighth, and twelfth plates to each other in ♀ as 80 : 81 : 75 : 85 : 87 : 82; in a ♂ as 69 : 70 : 65 : 74 : 75 : 73. The first plate is slightly wider than the head.

Head wider than long (67 : 65 in a ♂; 77 : 75 in a ♀). Of the usual general form, being widest near or in front of lateral marginal breaks. A U-shaped impression, which is not very deep, on caudal portion, the mark being connected at its middle with a short longitudinal furrow extending to the caudal marginal thickening; a rather deep short transverse submarginal sulcus a little caudad of level of marginal break on each side. Surface a little uneven, subsparingly and rather finely punctate.

Eyes consisting mostly of from thirteen to twenty ocelli arranged in three or four, but much most commonly in four series; *c.g.*, 1 + 4, 5, 4, 2; 1 + 5, 5, 3, 2; 1 + 6, 6, 4, 3; 1 + 6, 5, 4, 2; 1 + 5, 5, 4, 2; 1 + 5, 5, 4; 1 + 6, 5, 3; 1 + 5, 4, 3. Seriate ocelli distinct, decreas-

ing gradually and but little cephalad and ventrad, those of the most ventral row often very small. Single ocellus separated by a space from the others; pale; subtriangular, with the sides convex and the angles rounded.

Antennae of moderate length but varying considerably, mostly reaching the seventh segment, but sometimes the eighth and rarely even the ninth on one side. Articles from twenty to as many as twenty-eight; mostly long and subcylindric, distal ones slender; the ultimate much shorter than the two preceding taken together, or when the articles are twenty often but little longer than the penult or even shorter than it. In antennae with the larger numbers of articles a variable number of those preceding the ultimate have become divided, giving correspondingly shorter articles; thus in an antenna with twenty-four articles the first eleven may be of the usual long form while the next six have divided, giving twelve decidedly shorter articles which with the ultimate increases the number from twenty to twenty-four, etc. (Plate 5, fig. 3, 4). Often the antennae with the larger number of articles are relatively shorter than those with fewer. Hairs very short, dense.

Prosternum between 1.66+ and 1.8 times wider than long. Distance between chitinous spots 2 to 2.25 times the dental line, 1.8 or 1.9 times width at level of bottom of mesal sinus. Spine situated very close to or nearly upon anterior margin; stout at base and distally acuminate as usual. Nearly always two teeth ectad of each diastema, sometimes but one on one or both sides or with these on one side, much more rarely upon both. Much the most frequent arrangement noted is 2 - 7 + 6 - 2, with the larger number on the left side. Other arrangements observed are as follows, the left side being represented first: 2 - 6 + 7 - 2; 2 - 6 + 6 - 3; 2 - 6 + 6 - 1; 2 - 6 + 6 - 2; 1 - 6 + 6 - 1; 2 - 6 + 7 - 1; 2 - 11 + 6 - 2; 3 - 6 + 6 - 2; 3 - 6 + 6 - 3.

First dorsal plate of the usual form; surface like that of head; twice as wide as long. Other plates rugose and tuberculate laterally, the median portion remaining smoother, the roughening becoming more and more pronounced in going caudad; the roughening clearly less than in *E. xanti*. The short submarginal transverse sulci near beginning of the caudal third evident on the first, third, fifth, eighth, tenth, twelfth, and fourteenth plates as usual but apparently less pronounced than in *E. integer*; from the inner end of each of these extends a furrow mesocephalad and another directly cephalad to the anterior margin, the latter furrow on the more caudal plates extending through to or nearly to the caudal margin.

Posterior angles of none of the dorsal plates produced; those of the ninth, eleventh, and thirteenth straight to considerably obliquely excised, occasionally those of the thirteenth very slightly produced.

Ventral plates with the usual three longitudinal furrows of which the median one is mostly pit-like and confined to the caudal part of plate but may be more indistinctly extended cephalad and caudad. In the female the fourteenth and fifteenth plates are transversely depressed across the middle with the furrows obscure; but in the male the furrows are strongly impressed, the lateral ones on the fourteenth converging caudad and commonly ending abruptly at beginning of caudal fourth of length, while on the fifteenth the lateral furrows are subparallel or a little excurved and terminate abruptly as on the fourteenth, while the median furrow on both plates is typically reduced to one or a row of a few impressed dots or pits but may appear as a continuous sulcus, especially on the fourteenth; the lateral furrows also may appear as rows of dot-like pits. A wide lateral and caudal border on both of these plates is smooth and densely clothed with fine short hairs.

Coxal pores mostly twenty-five to forty-five in number on each coxa, the smallest number being on the twelfth pair. Series three to five, the most anterior of which is often irregular or confused.

Spines of first legs,  $\begin{smallmatrix} 0, 0, 3, 2, 1 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$ ; of the second,  $\begin{smallmatrix} 0, 0, 3, 2, 1 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$  or  $\begin{smallmatrix} 0, 0, 3, 2, 2 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$ ; of the third to tenth,  $\begin{smallmatrix} 0, 0, 3, 2, 2 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$ ; of the eleventh,  $\begin{smallmatrix} 0, 0, 3, 2, 2 \\ 0, 0, 3, 3, 2 \end{smallmatrix}$ ; of the twelfth,  $\begin{smallmatrix} 0, 0, 3, 2, 2 \\ 0, 1, 3, 3, 2 \end{smallmatrix}$  or  $\begin{smallmatrix} 1, 0, 3, 2, 2 \\ 0, 1, 3, 3, 2 \end{smallmatrix}$ ; of the thirteenth,  $\begin{smallmatrix} 1, 0, 3, 2, 2 \\ 0, 1, 3, 3, 2 \end{smallmatrix}$ ; of the penult,  $\begin{smallmatrix} 1, 0, 3, 1, 1 \\ 1, 1, 3, 3, 2 \end{smallmatrix}$ , with two accessory claws; of the anal,  $\begin{smallmatrix} 1, 0, 3, 1, 0 \\ 1, 1, 3, 2, 1 \end{smallmatrix}$  to  $\begin{smallmatrix} 1, 0, 3, 1, 0 \\ 1, 1, 3, 3, 1 \end{smallmatrix}$ , the claw single or with a minute accessory claw. Last two pairs of coxae laterally armed or, occasionally, only the last pair.

Claw of gonopods of female of moderate size, comparatively broad distally, distinctly tripartite, the median lobe largest, the lateral proximad of the median (Plate 5, fig. 1). Occasionally one lateral tooth may be replaced by two or more minute denticles or may be almost obliterated. Basal spines 3 + 3 to 4 + 4, typically gradually and uniformly narrowing from base to the subacute distal point. When a fourth spine is present it is commonly small and inserted on mesal side of article where it is easily overlooked (See Plate 5, fig. 2).

Length from 20 to 28 mm. A female 28 mm. long has the anal leg 12 mm. long and the tenth dorsal plate 3.6 mm. wide.

*Pseudomaturus*.—Light brown, the major dorsal plates with the three longitudinal pale lines well marked, last segment darker. Head pale orange, dusky, clearer in color immediately along the frontal suture. Prosternum and prehensorial feet pale orange. Antennae yellowish or light orange-brown, paler distad. Legs pale, the tarsi

brighter. Last pairs light orange, somewhat duller in color proximally. Venter pale brown, the last segment a little darker.

Ocelli 1 + 5, 5, 3, 2 in specimen described. Single ocellus very much larger than any other, suborbicular or broadly suboval with the narrower end ventrocephalad. Organ of Tomösvary in outline smaller than smallest ocellus, in line with ventral row and close to anterior ocellus of same.

Antennae, in specimens examined, composed of from twenty to twenty-two articles, when twenty-two the extra ones apparently resulting from subdivision of the penult and antepenult articles; the ultimate article relatively shorter than in earlier stages.

Prosternum with chitinous lines distinct. Teeth 2 - 6 + 6 - 2. Spine as in *maturus*.

Coxal pores eleven to nineteen in number, in three series, sizes varying as in *maturus*.

Spines of first to third legs,  $\frac{0, 0, 3, 2, 1}{0, 0, 2, 3, 2}$ ; of the fourth,  $\frac{0, 0, 3, 2, 1}{0, 0, 2, 3, 2}$  or  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$ ; of the fifth to ninth,  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$ ; of the tenth,  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$  to  $\frac{1, 0, 3, 2, 2}{0, 0, 3, 3, 2}$ ; of the eleventh,  $\frac{1, 0, 3, 2, 2}{0, 0, 3, 3, 2}$ ; of the twelfth,  $\frac{1, 0, 3, 2, 2}{0, 1, 3, 3, 2}$ ; of the thirteenth,  $\frac{1, 0, 3, 2, 1}{0, 1, 3, 3, 2}$  or  $\frac{1, 0, 3, 2, 2}{0, 1, 3, 3, 2}$ ; of the penult,  $\frac{1, 0, 3, 1, 1}{1, 1, 3, 3, 2}$ ; of the anal,  $\frac{1, 0, 3, 1, 0}{1, 1, 3, 2, 1}$ .

Fifteenth and succeeding segment subdensely pilose on ventral surface, hair of the fourteenth fewer.

Claw of the female gonopods shorter and thinner and less strongly chitinized than in the adult, the teeth as usual. Basal spines 3 + 3, but the innermost on each side only about one half the height of the median one and much more slender.

Length 19 mm.; antennae 10 mm.

*Praematurus*.—Pale brown, with violaceous tint showing through from beneath. Head in front of suture, light orange, elsewhere darkened or smoky. Antennae pale brown to yellowish, tending towards orange, paler distad.

Ocelli 1 + 4, 3, 2; 1 + 4, 4, 2. Rather pale. The single ocellus larger than the first one of the upper row, the anterior ones of ventral row very small.

Antennae reaching well along on eighth segment. Articles twenty, all of moderate length or long, the last one much longer than the penult.

Prosternal teeth 2 - 5 + 5 - 2.

Coxal pores very small, the distal one of caudal series conspicuously largest; arranged in two series, four to nine in number on each coxa, the smallest number occurring on the twelfth and the fifteenth coxae.

Spines of first and second legs,  $\frac{0, 0, 3, 2, 1}{0, 0, 2, 3, 1}$ ; of the third to the sixth,

$0, 0, 3, 2, 1$ ; of the seventh to the ninth,  $0, 0, 3, 2, 2$ ; of tenth and eleventh,  $0, 0, 2, 3, 2$ ; of the twelfth,  $1, 0, 3, 2, 2$ ; of the thirteenth,  $1, 0, 3, 1, 1$ ; of the penult,  $1, 0, 3, 1, 1$ . (Anal missing). Coxae of last two pairs armed as in the adult.

Fifteenth ventral plate subdensely pilose, especially over the caudal portion.

Claw of female gonopods pale, short, and thin, not curved, the lateral teeth appearing only as points at base. Spines 2 + 2, the innermost on each side short and very slender, almost bristle-like.

Length of male 13 mm.; antennae 7.5 mm. Length of female, 15 to 16 mm.; antennae 7.5 to 7.8 mm.

TYPE LOCALITY.—California (Shasta Springs).

KNOWN LOCALITIES.—California (Truekee! Shasta Springs! Hayward). Oregon (Portland! Oregon City!).

Ranging from Portland southward along the Sierra Nevada Mountains. It seems not to occur in the coastal mountains or the region south of San Francisco Bay. North of Oregon it is replaced by *E. integer* Chamberlin, a closely related species.

#### ETHOPOLYS INTEGER Chamberlin.

Plate 5, fig. 6–8. Plate 6, fig. 1.

*Ethopolys integer* Chamberlin, Rept. Can. Arctic exped., 1913–18, 1919, 3, pt. H, p. 20 H.

DESCRIPTION.—Dorsum mostly dark brown with the caudal plates darker; major plates often darkened over the lateral and caudal borders; major plates of posterior half of body typically with a distinct longitudinal median black stripe, this becoming indistinct on the more anterior ones; main plates commonly with a light stripe extending obliquely caudolaterad on each side from near middle of anterior margin. Head, as also in part the first dorsal plate in some, reddish brown to chestnut; a blackish median longitudinal stripe extending from caudal margin to frontal suture caudad of which it expands laterad. Antennae brown to light chestnut, paler, light brown, distad. Venter light brown, the fourteenth and fifteenth sternites commonly of a chestnut tinge. Prosternum and prehensors brown of a light chestnut tinge. Legs testaceous, the posterior pairs darker, brown to light chestnut-brown.

Body of same form in male and female; or nearly so. About eight times longer than width of the tenth plate. Head and first dorsal

plate of same width, narrower than the tenth plate. Widths of head and of first, third, eighth, tenth, and twelfth dorsal plates to each other in ♂ as, *e.g.*, 77 : 77 : 70 : 78 : 79 : 78 or 72 : 73 : 66 : 75 : 76 : 73; and in ♀ as, *e.g.*, 84 : 84 : 78 : 87 : 87 : 85 or 84 : 84 : 76 : 86 : 87 : 85.

Head distinctly wider than long (86 : 79); widest a little caudad of lateral breaks. A V-shaped impression on caudal half of cephalic plate. Entire surface subdensely punctate, the puncta distinct.

Ocelli from twelve to nineteen in three or four series, but by far most commonly in 4; *e.g.*, 1 + 5, 6, 4, 3; 1 + 6, 5, 4, 3; 1 + 5, 5, 4, 2; 1 + 5, 5, 3, 2; 1 + 5, 5, 4, 3; 1 + 5, 5, 3, 1; 1 + 5, 4, 3, 2; 1 + 5, 4, 2; 1 + 5, 5, 4; 1 + 6, 5, 3. Single ocellus much largest, suborbicular to somewhat angular, clearly separated by a space from the others. Seriate ocelli distinct, regular, decreasing moderately ventrad and cephalad.

Antennae reaching to from the fifth to the eighth segments, but mostly to the sixth or the seventh. Articles twenty to twenty-four mostly long and cylindric or nearly so, mostly not clavate or but slightly so. Ultimate article long and slender, a little shorter than the two preceding together.

Prosternum *cir.* 1.7 times wider than long. Distance between chitinous spots in specimen measured 1.97 times the dental line and 1.75 times the width at level of bottom of median sinus. Chitinous lines well developed excepting toward caudal ends. Finely, densely punctate. Spine inserted on ventral surface a little caudad of the anterior edge; moderately short, uniformly attenuated to an acute point; much stouter than the bristles (Plate 5, fig. 7). Teeth conical, subacute or apically narrowly rounded; those adjacent to diastema on each side largest, others very gradually decreasing ectad and mesad from these. Most commonly three or four teeth ectad of diastema but also in some only two. Examples of arrangement are as follows, the left side being indicated first in the formulae: 3 - 7 + 6 - 3, the commonest of all arrangements and numbers; 3 - 6 + 6 - 3; 3 - 5 + 6 - 3; 4 - 6 + 6 - 4; 2 - 6 + 6 - 3; 2 - 6 + 6 - 2; 2 - 6 + 5 - 2.

First dorsal plate narrowed from anterior end caudad as usual, wider than long nearly in ratio 21 : 11; surface nearly like that of head, punctate but not rugose. Major plates with the short transverse impressions at caudal third of length deeply marked. A furrow extending from inner end of each of these submarginal sulci obliquely mesocephalad to near middle of anterior margin and also an irregular deep furrow extending directly cephalad to anterior margin. All



plates distinctly and rather coarsely punctate, and, especially the more caudal ones, subfinely rugose and irregularly tuberculate toward lateral borders, the median portion remaining nearly smooth excepting on the fifteenth plate.

Ventral plates, excepting last one or two, densely finely punctate over entire surface. A lateral longitudinal impression in front of the short suture at each caudolateral corner, these being more narrowly and sharply impressed on caudal plates. On the caudal portion between the lateral impressions is a short median pit or depression which, however, is sometimes elongate. The fifteenth sternite is wholly smooth over a wide lateral and caudal border and is here densely clothed with very fine, short hairs. In the male the fourteenth plate has a V-shaped impression formed by two distinct sulci converging from the anterior margin to a point at or a little in front of the caudal margin or these converging sulci sometimes ending farther cephalad and not meeting; also a median longitudinal sulcus usually of same distinctness as the lateral ones. In the male the fifteenth sternite also is marked with three deeply impressed longitudinal sulci which terminate at the beginning of the smooth caudal border; of these the lateral converge a little but less than those of the fourteenth plate.

Spines of first legs,  $\begin{smallmatrix} 0, 0, 3, 2, 1 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$  to  $\begin{smallmatrix} 0, 0, 3, 2, 2 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$  (at least on one side); of the second to tenth,  $\begin{smallmatrix} 0, 0, 3, 2, 2 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$ ; of the eleventh,  $\begin{smallmatrix} 0, 0, 3, 2, 2 \\ 0, 0, 3, 3, 2 \end{smallmatrix}$ ; of the twelfth,  $\begin{smallmatrix} 1, 0, 3, 2, 2 \\ 0, 1, 3, 3, 2 \end{smallmatrix}$  or  $\begin{smallmatrix} 0, 0, 3, 2, 2 \\ 0, 1, 3, 3, 2 \end{smallmatrix}$ ; of the thirteenth,  $\begin{smallmatrix} 1, 0, 3, 2, 2 \\ 0, 1, 3, 3, 2 \end{smallmatrix}$ ; of the penult,  $\begin{smallmatrix} 1, 0, 3, 1, 1 \\ 1, 1, 3, 3, 2 \end{smallmatrix}$ , with two accessory claws; of the anal,  $\begin{smallmatrix} 1, 0, 3, 1, 0 \\ 1, 1, 3, 2, 1 \end{smallmatrix}$ , claw single or with a very minute accessory claw. Last two pairs of coxae, or occasionally only the last pair, laterally armed.

Anal legs of male moderately long, slender, the fourth joint with a longitudinal dorsal sulcus over the median portion and ectad of this a longer sulcus extending the full length of the joint; corresponding to the latter there is an ectodorsal longitudinal sulcus on the fifth joint. Third joint with a longitudinal dorsal sulcus.

Claw of female gonopods long and well curved; entire, with no trace of lateral teeth (Plate 5, fig. 8). Basal spines 3 + 3; acuminate from near middle of length, apically narrowly rounded.

Length 20 to 30 mm. A female 29 mm. long has anal leg 12 mm. long, antennae 15 mm. long and the tenth dorsal plate 3.6 mm. wide. A male 25 mm. long has the tenth plate 3.2 mm. wide.

TYPE LOCALITY.—Washington (Pullman!).

KNOWN LOCALITIES.—Washington (Wenatschee! Pullman!). Oregon (Corvallis!).

This species is very close in general appearance and structure to

*E. sierraragus* Chamberlin: but the females are easily separated by the character of the gonopods. They differ ordinarily in the relative length of the ultimate article of the antennae; in the proportionate length of the prosternal dental line and the modal number of teeth ectad of the diastema; and in various other minor points.

ETHIOPOLYS INTEGER ALASKANUS Chamberlin.

Plate 6, fig. 2.

Rept. Can. Arctic exped. 1913-18, 1919, 3, pt. H., p. 21 H.

While in *E. integer* the head and first dorsal plate are strongly and rather coarsely punctate, especially over the anterior portion of the head, these parts in the Alaskan specimens representing the present subspecies are smooth and wholly without punctae or very nearly so.

Posterior angles of thirteenth dorsal plate weakly produced, those of the eleventh showing slightly a similar tendency.

The claw of the female gonopods in the two type females has a distinct tooth on the inner side toward the distal end but none on the outer, being thus bipartite instead of essentially entire as in *integer*, or tripartite as in *sierraragus*.

In the two female types from Forrester Island a median dorsal black stripe is distinctly marked from the caudal end of the fourteenth plate cephalad to the frontal suture of the head. In one specimen the dorsum is dark brown, dusky about edges of plates and with the head and most caudal plates of a dilute chestnut cast; the posterior legs testaceous, streaked with dark. The other specimen is much darker with the chestnut tinge affecting all the plates.

The specimens from Sitka (males), presumably of the same subspecies, as they are at present wholly lack any reddish tinge, the color being a dull, nearly uniform, dusky olive brown.

Dorsal spines of first legs in Sitka specimens 0, 0, 2, 2, 1. Dorsal spines of second legs in specimens from both localities may be 0, 0, 3, 2, 1 or 0, 0, 3, 2, 2.

Length of max. ♀, 23 mm.

TYPE LOCALITY.—Alaska (Forrester Island!).

Collected by Harold and Ronald Heath. Also taken in Alaska (Sitka!).

## ETHOPOLYS PUSIO (Stuxberg).

Plate 6, fig. 3-6.

*Lithobius pusio* Stuxberg, Öfvers. Kongl. vet. akad. Förh., 1875, **32**, no. 2, p. 66. Ann. mag. nat. hist., 1875, ser. 4, **15**, p. 188.

*Lithobius (Archilithobius) pusio* Stuxberg, Öfvers. Kongl. vet. akad. Förh., 1875, **32**, no. 3, p. 16, 30. Proc. Cal. acad. sci., 1876, **7**.

*Bothropolys pusio* Chamberlin, Can. ent., 1911, **43**, p. 378.

*Ethopolys pusio* Chamberlin, Can. ent., 1912, **44**, p. 174.

DESCRIPTION.—Dorsum brown commonly of a reddish tinge or chestnut, head usually not darkened, being concolorous with dorsum; some of major plates in same specimens with the caudal border very dark and some with a median dark stripe. Antennae reddish brown, pale distad. Prosternum brown, with the prehensors light, often rusty, yellow. Posterior ventral plates like the prosternum, the rest of the venter and the legs lighter brown, the caudal pairs of legs being commonly lighter, yellow, distad.

The body from 7.6 to 8+ times longer than width of tenth plate, apparently more robust in the male. In the male widest at tenth plate, the body attenuated cephalad to the second segment; first plate narrower than the eighth. In the female the eighth and tenth plates are rather more nearly equal in the width and the attenuation of the body slighter.

Head subcordate, the sides between the eyes and the rounded caudal corners weakly excurved and slightly converging caudad. Anterior margin arcuate, being convex at middle, then on each side concave, and then again convex adjacent to the antennae. Wider than long in about ratio 47 : 43 or nearly 12 : 11. The usual short, sharply impressed, curved sulcus extending mesad or cephalomesad from each lateral margin near the break. A short furrow near each caudolateral corner. Head finely and lightly punctate.

Eyes consisting of from eleven to thirteen ocelli in three series: *e. g.*, 1 + 5, 3, 2; 1 + 5, 4, 3; 1 + 4, 4, 2; 1 + 4, 4, 3, which is frequent. Ocelli usually not deeply pigmented, greyish; decreasing in size ventrad. Single ocellus subcircular, but little larger than the adjacent one of the first row. Organ of Tomösvary in outline much smaller than the smallest ocellus, at anterior end of most ventral row of ocelli.

Antennae short, reaching the sixth dorsal plate. Composed normally of twenty articles which are moderately long and nearly uniform

in proportions. Clothed with moderately long and sometimes somewhat rufous hairs.

Prosternum one and two thirds times wider than long. Chitinous lines distinct. Mesal incision narrow, acute. Spine slender, distally bristle-like. One tooth ectad of diastema. Teeth mostly 6 + 6 or 6 + 7.

Posterior angles of none of the dorsal plates produced. Third, fifth, eighth, tenth, twelfth, and fourteenth with the usual short, submarginal sulcus on each side near beginning of caudal third of length; the seventh with a similar but less distinct impression farther caudad and a second similarly weak one toward anterior corner. Plates finely rugose, most with two sublongitudinal and often broken furrows, one a little each side of middle, and sometimes, especially on the caudal segments, also with a median longitudinal furrow which may be doubled.

First ventral plate with entire surface concavely depressed. Others with three longitudinal furrows, of which the median is rather short and often pit-like and lying near the middle portion of plate; sometimes with two poorly defined transverse furrows which on the anterior plates lie one near the anterior margin and one near the caudal, the anterior one lying farther caudad and the posterior one being more deeply impressed on the more posterior segments. On the posterior segments the median furrow becomes longitudinally elongate. On the fifteenth plate, especially in the male, the three longitudinal furrows are most distinct and converge commonly over nearly entire length of plate caudad to a less sharply defined transverse furrow in front of the caudal margin.

Coxal pores as usual of various sizes, mostly small and very small. Arranged in two or three series and usually from seven or eight on the twelfth to twelve on the other coxae.

Spines of first legs,  $\begin{smallmatrix} 0, 0, 3, 2, 1 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$ ; of the second to the tenth,  $\begin{smallmatrix} 0, 0, 3, 2, 2 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$ ; of the eleventh,  $\begin{smallmatrix} 1, 0, 3, 2, 2 \\ 0, 0, 3, 2, 2 \end{smallmatrix}$ ; of the twelfth,  $\begin{smallmatrix} 1, 0, 3, 1, 1 \\ 0, 1, 3, 3, 2 \end{smallmatrix}$ ; of the thirteenth,  $\begin{smallmatrix} 1, 0, 3, 1, 1 \\ 0, 1, 3, 3, 2 \end{smallmatrix}$ ; of the penult,  $\begin{smallmatrix} 1, 0, 3, 1, 1 \\ 1, 1, 3, 3, 2 \end{smallmatrix}$ , with two accessory claws; of the anal,  $\begin{smallmatrix} 1, 0, 3, 1, 1 \\ 1, 1, 3, 2, 1 \end{smallmatrix}$ . Last two pairs of coxae laterally armed.

Anal legs of moderate length and slender in both sexes.

Distal article of male gonopods considerably narrower than the first, apically rounded, with mostly two bristles; proximal article with four or five bristles.

Claw of female gonopods rather short and broad, tripartite, moderately curved. Basal spines 3 + 3 or sometimes only 2 + 2, cylindrical proximally and conical in outline distad, flattened or excavated on

dorsal side and sometimes with small accessory points at junction of cylindrical and distal portions.

Length mostly between 14 and 18 mm. A female 17.5 mm. long has the antennae 6.5 mm. and the anal leg *cir.* 5.5 mm. long, with the tenth plate 2 mm. wide. A male 15.2 mm. long has antennae 6 mm. and anal leg between 5.5 and 6 mm. long, with the tenth dorsal plate 2 mm. wide.

*Pracmaturus*.—Light brown or yellowish. Head light orange or light brown. Antennae orange or brown but paler distad. Legs whitish yellow to pale brown with caudal pairs more deeply pigmented, clearer yellow. Prosternum darker than venter with prehensors in darker specimens testaceous.

Ocelli in most cases 1 + 4, 3, 2; also 1 + 3, 3, 3, etc. Single ocellus suborbicular or broadly elliptic, paler than the others, of same size as most caudal ocellus of the upper row. Ocelli decreasing in size cephalad and ventrad.

Antennae composed of twenty long articles proportioned nearly as in the adult.

Prosternum with chitinous lines obscure. Spine as in *maturus*. Teeth mostly 6 + 6; distally well rounded. Ectal ones more widely spaced than others as in the *maturus*.

Impressions of head and dorsal plates already developed or indicated as in the adult.

Coxal pores small, usually in one series, which may be irregular, on the twelfth coxae, and in two series on the others; from three or four, on twelfth coxae, to seven or eight on each coxa.

Spines of first and second legs,  $\begin{smallmatrix} 0, 0, 3, 2, 1 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$ ; of the third to the ninth,  $\begin{smallmatrix} 0, 0, 3, 2, 2 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$ ; of the tenth,  $\begin{smallmatrix} 1, 0, 3, 2, 2 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$ ; of the eleventh,  $\begin{smallmatrix} 1, 0, 3, 1, 2 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$  or  $\begin{smallmatrix} 1, 0, 3, 1, 2 \\ 0, 0, 3, 3, 2 \end{smallmatrix}$ ; of the twelfth,  $\begin{smallmatrix} 1, 0, 3, 1, 2 \\ 0, 1, 3, 3, 2 \end{smallmatrix}$ ; of the thirteenth,  $\begin{smallmatrix} 1, 0, 3, 1, 1 \\ 0, 1, 3, 3, 2 \end{smallmatrix}$ ; of the penult,  $\begin{smallmatrix} 1, 0, 3, 1, 1 \\ 1, 1, 3, 3, 2 \end{smallmatrix}$ ; of the anal,  $\begin{smallmatrix} 1, 0, 3, 1, 0 \\ 1, 1, 3, 2, 2 \end{smallmatrix}$ .

Claw of female gonopods rather slender, pale, distally a little curved, entire or with lateral teeth appearing as mere points at base. Basal spines 2 + 2, the inner one on each side scarcely one half the length of the outer and very much more slender.

Length of specimen described 11.8 mm.; of antennae *cir.* 6 mm.; of anal legs *cir.* 4.8 mm.

*Immaturus*.—Pale above and below, light violaceous brown, the anterior and the caudal segments orange. Head and antennae orange, the latter more yellowish, pale distad. Legs pale, brighter, yellowish, distad; caudal pairs light orange or yellow.

Ocelli six to eight in two series: *e.g.*, 1 + 3, 2; 1 + 3, 3; 1 + 4, 3. Pale. The single ocellus larger than the adjacent ones.

Antennae composed already of the twenty articles, of which part are relatively shorter than in the adult.

Prosternal teeth 4 + 4 with the spine on the extended edge ectad of outermost tooth, no tooth ectad of spine as yet developed. Chitinous lines very distinct, complete.

Coxal pores pale, small, in one series on the fifteenth or on this and the twelfth and in two on the others; in number from two (fifteenth) and four (twelfth) to six or seven (thirteenth and fourteenth) on each coxa.

Spines of first legs,  $\frac{0, 0, 1, 1, 0}{0, 0, 0, 1, 1}$ ; of the second to eighth,  $\frac{0, 0, 2, 2, 1}{0, 0, 0, 1, 1}$ ; of the ninth,  $\frac{0, 0, 2, 1, 2}{0, 0, 1, 1, 1}$  to  $\frac{0, 0, 2, 2, 2}{0, 0, 1, 2, 1}$ ; of the tenth,  $\frac{0, 0, 2, 1, 2}{0, 0, 2, 2, 1}$  or  $\frac{0, 0, 3, 1, 2}{0, 0, 2, 2, 1}$ ; of the eleventh,  $\frac{0, 0, 2, 1, 2}{0, 0, 2, 2, 1}$  or  $\frac{0, 0, 3, 1, 2}{0, 0, 2, 2, 1}$ ; of the twelfth,  $\frac{0, 0, 2, 1, 1}{0, 0, 2, 2, 1}$  or  $\frac{1, 0, 3, 1, 1}{0, 0, 2, 2, 1}$ ; of the thirteenth,  $\frac{1, 0, 2, 1, 1}{0, 1, 2, 1, 1}$  to  $\frac{1, 0, 3, 1, 1}{0, 1, 2, 2, 2}$ ; of the penult,  $\frac{1, 0, 3, 1, 1}{0, 1, 3, 2, 0}$ ; of the anal,  $\frac{1, 0, 3, 1, 0}{1, 1, 3, 1, 0}$ , the lateral and dorsal spine of coxa also present, the lateral being small.

Gonopods in male appearing as simple, smooth, rounded prominences which are not yet biarticulate.

Gonopods of female triarticulate. Claw short, very pale, acutely pointed, with no signs as yet of lateral teeth. Basal spines 1 + 1, small, slender. Bristles very few.

Length, 6.5 to 8 mm.

TYPE LOCALITY.—California, near San Francisco (probably Sausalito).

KNOWN LOCALITIES.—California (Sausalito! Mill Valley! Brookdale! Santa Cruz Island! Capitola! Felton Big Trees!).

Stuxberg's types are evidently of the *immaturus* stage, a little later than those above described, as elsewhere indicated (Chamberlin, Can. ent., 1911, **43**, p. 379).

#### ETHOPOLYS MONTICOLA (Stuxberg).

*Lithobius monticola* Stuxberg, Öfvers. Kongl. vet. akad. Förh., 1875, **32**, no. 2, p. 65. Ann. mag. nat. hist., 1875, ser. 4, **15**, p. 188.

*Lithobius (Archilithobius) monticola* Stuxberg, Öfvers. Kongl. vet. akad. Förh., 1875, **32**, no. 3, p. 14, 30. Proc. Cal. acad. sci., 1876, **7**, p. 137.

*Bothropolys monticola* Chamberlin (*ex part. minor*), Pomona college journ. ent., 1910, **2**, p. 369.

*Ethopolys monticola* Chamberlin, Can. ent., 1912, **44**, p. 174.

DESCRIPTION.—Lamina cephalica subcircularis, eadem fere latitudine ac longitudine, margine postico subrecto, setis punctisque impressis sparse praedita.

Antennae mediocres, articulis 20 maximam partem cylindraceis, setis rigidis vestitis compositae.

Oculi longitudine triplo majore quam altitudine, ocellis 7-9 in 2 series longitudinales digestis.

Coxae pedum maxillarium secundi paris dentibus 6 + 6 conicis, acutiuculis, nigerrimis armatae.

Scuta dorsualia rugulosa, sparsissime pilosa, 2°, 4°, 6°, 7°, 9°, 11°, 13° margine postico recto, angulis posticis rectis vel rotundate rectangulis, 1°, 3°, 5°, 8°, 9°, 12°, 14° margine postico elevato sinuato, angulis parum productis, rotundatae acuminatis.

Scutum ventrale 15 mm. fovea longitudinale profundiore, cetera omnia plana.

Pori coxales numerosi, in 3-4 series irregulares dispositi.

Pedes primi paris calcaribus 2, 3, 2. Pedum analium articulus primus calcaribus binis, altero majore inferiore, altero minore laterali armatae. Pedes anales ungue singulo, calcaribus 1, 4, 3, 1 - 1, 4, 3, 2 armati.

Color non manifestus.

Longitudo corporis 18 mm. Stuxberg.

HABITAT.—Sierra Nevada (G. Eisen).

The identity of this species is at present a matter of considerable doubt. When it appeared that only one species of the Ethopolidae with none of the dorsal plates produced occurred in California, its identity with that form seemed probable; but the discovery of adult *E. pusio* makes this doubtful. The ocelli are given as seven to nine in two series. This agrees neither with adult *pusio* nor young *sierravagus*. If it be assumed that Stuxberg failed to note the most ventral row of eyes, then the agreement is close with adult *pusio* while the number would be still too small for *sierravagus*. The number of prosternal teeth agrees with *pusio* but is too small for *sierravagus* of the length given, so far as noted by the author. The spine-formula as given for the anal legs does not agree with that of either species as it stands. It is quite possible, indeed, that *monticola* is not the same as either of the species, and the only course open at present, therefore, is so to regard it. Should *pusio* and *monticola* prove to be the same, the latter name would have precedence.

## ETHOPOLYS (?) CALIFORNICUS (Daday).

*Lithobius californicus* Daday, Termes. füzetek., 1889, **12**, p. 153.

DESCRIPTION.—Corpore sat robusto, flavescenti; capite saturatiore colorato; antennis pedibusque dilute flavescentibus; oculis utrinque 14 in seriebus tribus positis; coxis pedum maxillarium dentibus 8 armatis; laminis dorsalibus inermibus, leviter punctatis; poris coxalibus multi seriatis, parvis rotundis; pedibus analibus sat crassis, ungue singulo; infra calcaribus 0, 1, 4, 3, 1, in articulo primo calcaribus duobus lateralibus armatis; calcarium genitalium femineorum tribus paribus.

Longit. corp. 20 mm. Latit. corp. 3 mm.

Patria: California borealis. Specimen unicum in spiritu vini rectif. conservatum a D. Joanne Vadonna collectum.

This species is placed under *Ethopolys* rather than *Bothropolys* because of the presence of 3 + 3 basal spines on the female gonopods. However, if a ventral spine is absent from the anal coxae as represented, it probably belongs to neither of these genera; but it is possible that one of the two lateral spines mentioned is the real ventral spine. The species is readily separated by its robustness and the small number of prosternal teeth 4 + 4. It is impossible, however, on account of the insufficiency of the description and of our knowledge of the myriopod fauna of a broad strip of country along the coast of California north of San Francisco, to say anything more definitely of this form without study of the type. The unusual spining given for the anal leg is probably due to including a dorsal spine on third and fourth articles, as it is probable Stuxberg did in the case of *monticola*.

ETHOPOLYS sens. str.

ETHOPOLYS XANTI (Wood).

Plate 4, fig. 1-6.

- Bothropolys xanti* Wood, Journ. Acad. nat. sci. Phil., 1863, new ser., **5**, p. 15. Trans. Amer. philos. soc., 1865, **13**, p. 152. Chamberlin, Pomona coll. journ. ent., 1910, **2**, p. 369. Chamberlin, Can. ent., 1911, **43**, p. 378.
- Lithobius xanti* Stuxberg, Öfvers. Kongl. vet. akad. Förh., 1875, **32**, no. 3, p. 10, 27. Proc. Cal. acad. sci., 1876, **7**, p. 135. Bollman, Proc. U. S. N. M., 1887, **10**, p. 261. Chamberlin (*ad part. min.*), Proc. U. S. M., 1901, **24**, p. 24. Proc. Acad. nat. sci. Phil., 1902, p. 42. Ann. Ent. soc. Amer., 1909, **2**, p. 190.
- Ethopolys xanti* Chamberlin, Can. ent., 1912, **44**, p. 173.



DESCRIPTION.— Brown to rusty brown and ferruginous, sometimes very dark, in part suffused with blackish. The head and the first one and usually one to several caudal plates darker and more reddish. Venter and most legs clear brown, the tarsi of the legs more brightly colored, the posterior sternites and legs darker, ferruginous or ferrugineotestaceous. Prosternum and prehensorial feet somewhat ferrugineotestaceous. Antennae usually dark brown, sometimes of a reddish tinge, a little paler at tips.

Body mostly from 8 to 8.6 times longer than width of tenth plate, of nearly same size and proportions in both sexes. Eighth and tenth plates of same width, with the first but little narrower.

Head wider than long in about ratio 73 : 70. Of usual shape, the sides a little converging from behind eyes caudad. Caudal margin straight or very slightly incurved mesally. Anterior margin in form of three convex lines or crenations of which the median is much smaller. Nearly smooth, polished, very finely punctate; the usual distinct, short, transverse submarginal sulcus on each side near marginal break.

Ocelli from ten to eighteen in mostly four rows: *c. g.*, 1 + 5, 5, 4, 2; 1 + 5, 4, 4, 2; 1 + 4, 4, 3, 1; 1 + 5, 4, 3, 1. Single ocellus very large, obliquely elliptical, pale. Seriate ocelli decreasing in size ventrad; series very regular. Organ of Tomösvary a little in front of anterior ocellus of most ventral row and very small in outline.

Antennae long, reaching usually to the eighth segment of body. Articles normally twenty, all long or very long, not densely clothed with rather short hairs.

Prosternum *cir.* 1.67 times wider than long. Chitinous lines incomplete below. Mesal incision narrow and rather deep, the sides a little converging caudad, and the bottom narrowly rounded. Spine acuminate, slender distally as usual, inserted on very anterior edge of diastema in adults. Either two or three teeth normally ectad of diastema. Teeth varying in number from 6 + 7 to 10 + 10 (Plate 4, fig. 2).

The first, third, fifth, eighth, tenth, twelfth, and fourteenth plates with the usual short submarginal sulcus on each side at about beginning of the caudal third; on the seventh plate a similar impression near each caudal and each anterior corner, the tenth having also a mark at each anterior corner but this absent or obscure on the others. Excepting the first all the dorsal plates are very much roughened with tubercular and rugose elevations. Each major plate excepting the first with a median longitudinal furrow and on each side one running from close to anterior end of this obliquely ectocaudad and further laterad another

furrow subparallel with margin and meeting or crossing the oblique furrow at an acute angle. Posterior angles of ninth, eleventh, and thirteenth dorsal plates strongly produced.

Ventral plates with the usual three furrows which are most distinct on the caudal plates, the median mostly deepest, but all, and especially the median, becoming less and less distinct cephalad. On the fifteenth plate the three furrows are very deep and end abruptly in front of the smooth, pilose caudal border which covers about one fourth the length of the plate; the furrows not converging. On the fourteenth plate there is a transverse furrow in front of the caudal border at which the longitudinal furrows, which are less distinct than on the fifteenth, and especially so in the female, terminate or the medium sometimes crossing to the caudal margin.

Coxal pores small, less varying in size than in related species; those of the caudal row frequently but slightly larger than the others, the distal largest. From nine to thirty in number, and mostly in three, but often in four series, the number of pores in the rows not so much differing as usual.

Spines of first legs,  $\frac{0, 0, 3, 2, 1}{0, 0, 2, 3, 2}$ ; of the second to the ninth,  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$ ; of the tenth,  $\frac{1, 0, 3, 2, 2}{0, 0, 3, 2, 2}$  to  $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$ ; of the eleventh,  $\frac{1, 0, 3, 2, 2}{0, 0, 3, 2, 2}$ ; of the twelfth,  $\frac{1, 0, 3, 2, 2}{0, 1, 3, 3, 2}$ ; of the thirteenth,  $\frac{1, 0, 3, 2, 2}{0, 1, 3, 3, 2}$ ; of the penult,  $\frac{1, 0, 3, 1, 1}{1, 1, 3, 3, 2}$ , with two small accessory claws; of the anal,  $\frac{1, 0, 3, 1, 0}{1, 1, 3, 2, 1}$ , the claw single. Last two pairs of coxae laterally armed.

Anal legs long and slender in both sexes. The third and more distal articles longitudinally sulcate dorsally; ventrally the articles may show a longitudinal furrow each side of middle leaving a broad area between them.

Distal article of male gonopods much narrower than the proximal, long and cylindric in shape, distally broadly rounded; bearing mostly five or six bristles. Proximal article bearing on ventral surface seven or eight bristles.

Claw of female gonopods strongly curved, moderately long, acute, the lateral teeth small and borne well proximad, sometimes almost obliterated. Basal spines 3 + 3 or 4 + 4, or very rarely only 2 + 3 or 2 + 2; stout, conical, decreasing in size mesad on each side; when 4 + 4 the innermost on each side may be attached on mesal side where it is easily overlooked.

Length from 19 to 26 mm. in both males and females. A male 25 mm. long has the eighth and tenth plates 3.1 mm. wide, with the first 3 mm. wide; anal legs 10 mm. long; and the antennae 11 mm. long.

*Pseudomaturus* (early).—Brown. Head and antennae orange, the latter paler at tips. Legs lighter over tarsi as usual, the anal and penult pairs testaceous or pale ferruginotestaceous.

Markings of head and dorsal plates fully developed.

Ocelli 1 + 4, 4, 2; 1 + 4, 3, 2. Single ocellus large and elliptic.

Antennae long; composed of twenty long articles as in the *maturus*.  
Prosternal teeth 2 - 5 + 5 - 2

Coxal pores all small and very small toward, those of caudal side exceeding the more cephalic ones more than in the *maturus*, especially on the coxae with the fewer pores. Mostly from six to twelve in number in two (twelfth coxae) or three rows.

Spines of first to tenth legs,  $\begin{smallmatrix} 0, 0, 3, 2, 1 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$ ; of the eleventh,  $\begin{smallmatrix} 1, 0, 3, 2, 2 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$  or  $\begin{smallmatrix} 1, 0, 3, 2, 2 \\ 0, 0, 3, 3, 2 \end{smallmatrix}$ ; of the twelfth and thirteenth,  $\begin{smallmatrix} 1, 0, 3, 2, 2 \\ 0, 1, 3, 3, 2 \end{smallmatrix}$ ; of the penult,  $\begin{smallmatrix} 1, 0, 3, 1, 1 \\ 1, 1, 3, 3, 2 \end{smallmatrix}$ ; of the anal,  $\begin{smallmatrix} 1, 0, 3, 1, 0 \\ 1, 1, 3, 2, 1 \end{smallmatrix}$ .

Claw shorter and paler, especially proximally, and thinner than in the *maturus*, the lateral teeth about the same. Articles with somewhat fewer bristles. Basal spines 3 + 3, but the most mesal on each side very slender, attached on mesal surface and more dorsad than the others; the median spine relatively somewhat less robust than in *maturus*.

Gonopods of male pale, the basal joint cylindrical and the distal one conic. Distal article with one or two bristles, the proximal with two or three.

Length 15-17 mm.

*Praematurus*.—Light violaceous brown throughout, the head and the first segment and the last several segments darker; dorsal plates usually darker along the caudal and sometimes the lateral borders. Head lighter in front of frontal suture, dusky caudad of suture and about the eyes. Prosternum and prehensors somewhat orange, the latter distally somewhat rufous. Legs and venter paler than dorsum; anal legs rusty yellow.

Ocelli 1 + 4, 3, 2. Distinct; the most ventral much smaller; the single one as usual.

Antennae long. Articles 20, long.

Prosternum with chitinous lines very distinct. Teeth already 2 - 5 + 5 - 2 or 2 - 5 + 6 - 2.

Coxal pores six to eight in two series on each coxa, those of cephalic row few and often minute, sometimes close and nearly merged.

Spines of first legs,  $\begin{smallmatrix} 0, 0, 3, 2, 1 \\ 0, 0, 2, 3, 1 \end{smallmatrix}$ ; of the second to fourth,  $\begin{smallmatrix} 0, 0, 3, 2, 1 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$ ; of the fifth to tenth,  $\begin{smallmatrix} 0, 0, 3, 2, 2 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$ ; of the eleventh,  $\begin{smallmatrix} 0, 0, 3, 2, 2 \\ 0, 0, 3, 3, 2 \end{smallmatrix}$ ; of the twelfth and thirteenth,  $\begin{smallmatrix} 1, 0, 3, 2, 2 \\ 0, 1, 3, 3, 2 \end{smallmatrix}$ ; of the penult,  $\begin{smallmatrix} 1, 0, 3, 1, 1 \\ 0, 1, 3, 3, 2 \end{smallmatrix}$ ; of the anal,  $\begin{smallmatrix} 1, 0, 3, 1, 0 \\ 1, 1, 3, 2, 1 \end{smallmatrix}$ .

Claw of female gonopods pale, short and thin; median lobe acute, the lateral plainly indicated. Basal spines 2 + 2; the mesal one on each side slender, acute, and not more than one half the length of the outer one; the outer one moderately stout; both pale.

Gonopods of male with distal article very small, conical, the proximal rounded and narrowed distad; distal articles with one or two bristles, the proximal with two or three.

Length 12-15 mm.

*Immaturus*.—Pale yellowish brown, with violaceous showing through from beneath. Head and caudal segments pale orange or rusty yellow, the head darker caudad of the frontal suture. Legs pale, light tipped, the last pairs more yellowish.

Ocelli 1 + 4, 3, 1, the one in the most ventral row very small. Single ocellus scarcely larger than adjacent one of first row.

Antennae already with twenty articles, which are long as in the adult.

Prosternal teeth 1 - 5 + 5 - 1. Spine attached a little caudad of edge on ventral surface.

Coxal pores small, with pale margins, four to eight on each coxa in two series.

Spines of first legs,  $\begin{smallmatrix} 0, 0, 1, 1, 1 \\ 0, 0, 2, 2, 1 \end{smallmatrix}$  or  $\begin{smallmatrix} 0, 0, 2, 1, 1 \\ 0, 0, 2, 2, 1 \end{smallmatrix}$ ; of the second,  $\begin{smallmatrix} 0, 0, 2, 2, 1 \\ 0, 0, 2, 3, 1 \end{smallmatrix}$  or  $\begin{smallmatrix} 0, 0, 3, 2, 1 \\ 0, 0, 3, 2, 2 \end{smallmatrix}$ ; of the third to seventh,  $\begin{smallmatrix} 0, 0, 3, 2, 1 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$ ; of the eighth to tenth,  $\begin{smallmatrix} 0, 0, 3, 2, 2 \\ 0, 0, 2, 3, 2 \end{smallmatrix}$ ; of the eleventh,  $\begin{smallmatrix} 1, 0, 3, 2, 2 \\ 0, 0, 3, 3, 2 \end{smallmatrix}$ ; of the twelfth,  $\begin{smallmatrix} 1, 0, 3, 2, 2 \\ 0, 1, 3, 3, 2 \end{smallmatrix}$ ; of the thirteenth,  $\begin{smallmatrix} 1, 0, 3, 1, 2 \\ 0, 1, 3, 3, 2 \end{smallmatrix}$ ; of the penult,  $\begin{smallmatrix} 1, 0, 3, 1, 1 \\ 1, 1, 3, 3, 2 \end{smallmatrix}$ ; of the anal,  $\begin{smallmatrix} 1, 0, 3, 1, 0 \\ 1, 1, 3, 2, 1 \end{smallmatrix}$ .

Claw of female gonopods yellow, small, nearly straight, the lateral teeth indicated as acute points near its base. Basal spines 1 + 1, straight, pale.

Length *cir.* 11 mm. (Laurel Canyon, Los Angeles Co., Cal.).

*Agenitalis* II.—Violet-brown. The frontal region of head pale orange; caudal portion dusky. Legs pale; caudal pairs, especially distally, bright whitish yellow.

Ocelli 1 + 3, 2, the single ocellus equal in size to the adjacent one of the upper row.

The twenty articles of antennae, but few of the articles not already of the full proportionate size.

Prosternal teeth 1 - 5 + 4 - 1, the extra tooth on side having six teeth located on upper part of mesal incision and reduced in size.

Coxal pores from three to five in number; in mostly one, but sometimes in two, series.

Spines of the first legs,  $\begin{smallmatrix} 0, 0, 1, 1, 1 \\ 0, 0, 1, 1, 1 \end{smallmatrix}$  to  $\begin{smallmatrix} 0, 0, 2, 1, 1 \\ 0, 0, 2, 2, 1 \end{smallmatrix}$ ; of the second to the fifth,  $\begin{smallmatrix} 0, 0, 2, 2, 1 \\ 0, 0, 2, 2, 1 \end{smallmatrix}$ ; of the sixth to the tenth,  $\begin{smallmatrix} 0, 0, 3, 2, 1 \\ 0, 0, 2, 2, 1 \end{smallmatrix}$ ; of the eleventh,  $\begin{smallmatrix} 0, 0, 3, 2, 2 \\ 0, 0, 2, 2, 1 \end{smallmatrix}$ ; of the twelfth,  $\begin{smallmatrix} 0, 0, 3, 1, 2 \\ 0, 0, 2, 3, 1 \end{smallmatrix}$ ; of the thirteenth,  $\begin{smallmatrix} 0, 0, 3, 1, 1 \\ 0, 0, 3, 3, 1 \end{smallmatrix}$  or  $\begin{smallmatrix} 0, 0, 3, 1, 1 \\ 0, 1, 3, 3, 1 \end{smallmatrix}$ ; of the

penult,  $\frac{0, 0, 3, 1, 1}{0, 1, 3, 3, 1}$  or  $\frac{0, 0, 3, 1, 1}{0, 1, 3, 3, 2}$ ; of the anal,  $\frac{1, 0, 3, 1, 0}{1, 1, 3, 2, 1}$ . Lateral spines of last two pairs of coxae evident.

Anal glands no longer evident.

Length *cir.* 9.5 mm. (Laurel Canyon, Los Angeles Co., Cal.).

*Agentialis* I.—Violaceous. The head in front of suture and the caudal segments yellowish. Legs pale, commonly brighter at tips; caudal pairs from white to yellow. Prehensors yellowish, brighter distad. Antennae violaceous, yellowish at tips.

Ocelli 1 + 2, 2, the more caudal one in each of the two series considerably larger than the anterior one, dusky or brownish in color. Single ocellus not larger than the adjacent one of dorsal row. Organ of Tomösvary minute in outline, well separated from the ocelli.

In antennae of three specimens examined twenty articles are already present; in one specimen seventeen articles are present in right and twenty in left; and in another specimen sixteen are present in right and twenty in left. Articles varying in length, articles short and intermediate in size occurring at intervals.

Coxal pores small and pale margined; two on twelfth coxae, and one each of the others.

Dorsal plates with posterior angles of ninth, eleventh, and thirteenth dorsal plates produced, but those of the ninth only slightly so and the processes distally rounded.

Hairs of body and legs very sparse, the seriatly arranged ones of ventral surface of tarsi more numerous.

Spines of first legs,  $\frac{0, 0, 0, 1, 1}{0, 0, 0, 1, 1}$  or  $\frac{0, 0, 1, 1, 1}{0, 0, 0, 1, 2}$ ; of the second to sixth,  $\frac{0, 0, 2, 2, 1}{0, 0, 0, 1, 1}$ ; of the seventh and eighth,  $\frac{0, 0, 2, 2, 1}{0, 0, 1, 1, 1}$ ; of the ninth,  $\frac{0, 0, 2, 2, 2}{0, 0, 1, 1, 1}$ ; of the tenth,  $\frac{0, 0, 2, 1, 2}{0, 0, 1, 1, 1}$ ; of the eleventh,  $\frac{0, 0, 2, 1, 1}{0, 0, 1, 1, 1}$ ; of the twelfth,  $\frac{0, 0, 2, 1, 0}{0, 0, 1, 1, 1}$ ; of the thirteenth,  $\frac{0, 0, 0, 0, 0}{0, 0, 1, 1, 1}$ ; of the penult,  $\frac{0, 0, 0, 0, 0}{0, 0, 1, 1, 1}$ , the two accessory claws distinct; of the anal,  $\frac{0, 0, 0, 0, 0}{1, 0, 1, 1, 0}$ , the trochanter being without spine or bristle.

Anal glands still manifest.

Length 7-8 mm.

TYPE LOCALITY.—California (Fort Tejon).

KNOWN LOCALITIES.—California (San Bernadino Co.! Los Angeles! Laurel Canyon! Santa Monica! Claremont! Santa Barbara! Monterey! Pacific Grove! Cypress Point! etc., Stanford! Sausalito! Brookdale! Santa Barbara! Santa Cruz Island! etc.). Utah!

This is an abundant species in California along the coast and in the coast mountains from San Francisco to the southern part of the state, where it ranges in part with *E. pusio*. In the Sierras and northward it is replaced by *E. sierravagus* and *E. integer*; while in the Wahsatch Mountains of Utah it is almost wholly replaced by *Bothropolys permundus*, but there maintains a foothold in a number of limited areas.